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Copies of most volumes of the *Proceedings* since 1908 are available. These back numbers contain much valuable material dealing with the archaeology and natural history of Hants and Dorset. Many of the articles and addresses are well illustrated and contain studies not available elsewhere. Detailed indexes covering all issues of the *Proceedings* since 1903 are available to readers, consisting of (1) a printed index referring to the period 1903-1923, which is on sale (price 1/-), and (2) a card index, kindly compiled by Mr. W. S. Brown, dealing with material published between 1923 and the present number.

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3 MAR 1953



PRESENTED

11 FEB 1954

PROCEEDINGS
OF THE
Bournemouth
Natural Science
Society

VOL. XLIII

SESSION 1952-53

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PROCEEDINGS of the

Bournemouth
Natural Science Society

VOL. XLIII.
SESSION 1952-53

PUBLISHED BY THE SOCIETY AT ITS HOUSE,
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Introductory Note

The objects of the Society are declared in the second of its Rules to be "the promotion of the study of Science in all its branches, and of Public Education, by means of Lectures, Field Meetings, the reading and discussion of Papers, and in any way that the Council of the Society shall deem advisable."

The branches of Science at present represented are as follows:—**Archaeology and History, Astronomy, Botany, Entomology, Geography, Geology, Microscopy, Photography, Physics and Chemistry, and Zoology.**

During the **Winter Session**, from October to April, frequent meetings are held, comprising Lectures on subjects of scientific interest, illustrated by lantern slides, films, epidiascope, diagrams, specimens, and experiments.

Throughout the **Summer Session**, Field Meetings on an average of two or three a week, are held in suitable places in the neighbourhood of the town, or Coach and Train Tours are arranged to districts of scientific interest at a distance.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting.

The Society possesses a Library available for the use of members. Books may be borrowed by members, and there is a Reading Room in which works of reference may be consulted. The Museum contains many valuable scientific collections and specimens. The Library and the Museum serve to illustrate and illuminate the ten Sections of the Society. There is a well-equipped Dark Room for the use of members interested in Photography. The house stands in a pleasant garden of over an acre.

Members are elected by the Council, and pay an annual subscription of £1 10s. 0d. for full membership, or £15 for Life Membership. An Entrance Fee of 5/- is payable upon nomination for election. The Family Subscription (for members of a family living in the same house) is as follows:—First Adult Member, £1 10s. 0d.; Second Adult Member, £1; each additional Adult Member, 10/-; Children between 12 and 18 years, 10/- (Associate Members). Members living six miles or more from the Square pay half the above rates. Renewable monthly membership, 5/-, is available.

A bi-monthly Programme, giving full details of all meetings, is posted to every member, and a Volume of Proceedings is published annually, of which adult members receive a copy.

Application Forms for Membership and further particulars may be obtained from the Honorary Assistant Secretary,

Miss D. M. LOWTHER, B.Sc.,

Lonsdale, Mayfield Avenue,

Parkstone, Dorset.

(Tel. Parkstone 1219)

Bournemouth Natural Science Society

OFFICERS AND COUNCIL FOR 1953-54.

N.B.—University and other qualifications are only attached at first mention of names.

President

H. E. CLARKE, M.A., B.SC., F.R.I.C.

Chairman of Council

H. E. CLARKE.

Deputy Chairman of Council

W. J. READ, M.SC., F.R.I.C.

Council

THE OFFICERS AND CHAIRMEN OF SECTIONS (*ex-officio*).

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MRS. E. BRIMICOMBE	H. C. MAYO
HENRY BURY, M.A., F.G.S., F.L.S.	F. OGDEN
EMER. PROF. JOHN CAMERON,	MISS I. E. SHEFFIELD
M.D., D.SC.	W. G. SMITH
MRS. W. CHOME	H. K. STANTON
B. GORTON, M.R.C.V.S.	MRS. W. BOYD WATT, F.Z.S., M.B.O.U.

Chairmen of Sections

Archaeology and History : F. WILLIAMSON, F.R.HIST.S.
 Astronomy : W. P. WINTER, B.SC.
 Botany : E. CHAMBERS, F.L.S.
 Entomology : W. S. I. COX, F.R.E.S.
 Geography : H. DE CASTRO.
 Geology : D. A. WRAY, M.SC., PH.D., F.G.S.
 Microscopy : J. H. MURGATROYD, F.L.S., F.Z.S., F.R.E.S.
 Photography : A. W. LEGAT, M.INST.C.E.
 Physics and Chemistry : H. E. CLARKE.
 Zoology : V. DU B. SMYTHE, F.R.N.S.

Hon. Treasurer

W. J. WOODHOUSE, A.C.P., M.I.H.
 29, Twynham Road, Southbourne (Tel. : Southbourne 44880).

Secretaries

Hon. Secretary : W. S. BROWN, B.SC.
Hon. Assistant Secretary : MISS D. M. LOWTHER, B.SC.
Hon. Assist. Secretary (Programmes) : H. W. LEONARD.

Hon. Librarian

A. A. FOYLE.

Hon. Curator

F. WILLIAMSON.

Hon. Editor

F. COLEMAN, M.C., M.R.C.S., F.D.S.

Hon Auditors

H. C. MAYO, F. OGDEN.

Hon. Solicitor

G. A. TURNER.

Bankers

NATIONAL PROVINCIAL BANK LTD., BOURNEMOUTH.

COMMITTEES, 1953-54.**Finance and General Purposes:***Chairman* : H. E. CLARKE.

Hon. Treasurer : W. J. WOODHOUSE. *Hon. Secretary* : W. S. BROWN.
 H. BURY, J. CAMERON, E. CHAMBERS, A. W. LEGAT, F. OGDEN, W. J. READ,
 S. WHITAKER.

Library:*Chairman* :

J. H. BAILEY, H. E. CLARKE, A. A. FOYLE, MRS. W. PERCEVAL, W. J. READ,
 H. G. SADLER, F. WILLIAMSON.

Museum:*Chairman* : F. WILLIAMSON.

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 J. H. MURGATROYD, MRS. W. BOYD WATT, W. P. WINTER, D. A. WRAY.

Editorial:*Chairman* : F. COLEMAN.

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 W. J. WOODHOUSE.

Garden:*Chairman* : MRS. W. CHOME.

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Entertainment:*Chairman* : MRS. I. M. SIMMONS.

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 MRS. E. LEGAT, MRS. SEDGWICK, F. WILLIAMSON.

Bournemouth Natural Science Society

List of Members.

(Revised to December 9th, 1953)

*HONORARY MEMBER.

oORIGINAL MEMBER.

vVICE-PRESIDENT.

wGILBERT WHITE FELLOWSHIP

†PAST PRESIDENT.

lLIFE MEMBER.

aASSOCIATE MEMBER.

The year of election is given before the name of each member.

1952	Adam, Miss A. T.	17 Linwood Road
1947	Alabaster, Sir G., KT., O.B.E., K.C.	34 Pinecliffe Avenue, Southbourne
1947	Alcock, J. W.	24a Ovington Avenue, Iford
1948	Alcock, Mrs. A.	" "
1948	Alcock, Miss J.	" "
1948	Alcock, Miss M.	" "
1946	Allan, Miss M. W.	6 St. Alban's Crescent
1953	Anderson, A. Marchmont, O.B.E.	The Cottage, Oliver's House, Middle Hill, Wimborne
1953	Andrews, Mrs. G. E. M.	20 Caledon Road, Parkstone, Dorset
1951	Angus-Hay, Mrs. L. E.	9 Windermere Road
1943	Appleton, Miss M.	8 Cavendish Place
1951	Atkin, Miss M. G., M.C.H.S.	Lindale, 64 Wimborne Road
1952	Atkinson, Mrs. A., S.R.N.	40 Palmer Road, Oakdale, Poole
1948	Austin, Mrs. G.	Devon Towers, Westcliff Road
1953	Bagnall, Miss E. B., R.R.C.	4 Southerland Court, South Cliff Road
1950	Bailey, J. H.	39 Strouden Avenue
1950	Bailey, Mrs. A.	" "
1951	wBailey, Miss A. R.	Cressex Lodge, Binfield, Bracknell, Berks.
1950	Bain, Miss E. M.	15 Clarendon Road, Bournemouth West
1947	Ball, Miss W.	27 Heatherlea Road, Southbourne
1936	Banham, Miss E.	Newton Morell, Munster Road, Parkstone
1951	Barker, W., B.Sc.	Tide Brook, Upton Road, Poole
1951	Barker, Mrs. E.	" "
1951	Barrough, W.	Macomb Croft, 9 Florence Road, Boscombe
1952	aBeale, Master A. J.	44 Glenferness Avenue
1952	aBeale, Master P. B.	" "
1949	Beale, J. M., M.A.	" "
1949	Beale, Mrs. M.	" "
1952	Beaumont, Miss E. J.	17 Ravenscourt Road
1944	Bell, T. M., B.A., M.B., B.Ch., M.R.C.S., L.R.C.P.	255 Belle Vue Road, Southbourne
1941	Bell, Mrs. R. M.	" "
1942	Bennett, Miss D.	Martello Firs, Martello Road, Branksome Park
1942	Bennett, Miss M.	" "
1920	Bennett, Risdon, M.A.	Yew Tree Cottage, Broadstone
1950	Benwell, Miss P.	2 Woodland Way, Bearway
1947	Berrill, Miss M. E.	Heathlands Hotel, Grove Road

- 1953 Best, S. C.
 1953 Best, Mrs. E. H.
 1942 Bickel, T. H.
 1947 Binks, Miss I.
 1951 w Black, Mrs. E.
 1946 Blackmore, H. C., L.D.S.,
 R.C.S.
 1948 Blake, Mrs. N. D.
 1950 Bland, R.
 1950 Bland, Mrs. S.
 1942 Boardman, E.
 1950 Bone, Miss M. R. M.
 1944 Borrett, A. C.
 1944 Borrett, Mrs. L.
 1938 Bottomley, Dr. F. C.
 1947 Bowkett, Miss N.
 1952 Bowring, Miss M.
 1948 Brett, Mrs. A.
 1942 Brimicombe, Mrs. E.
 1926 *Broad, F., F.S.I.
 1921 Bromley, Miss
 1937 Brown, S. C. S., L.D.S., R.C.S.,
 H.D.D.
 1953 Brown, V. A. G.
 1948 Brown, W. S., B.Sc.
 1952 Browning, Miss I. G.
 1952 Browning, Miss K. L.
 1920 Brumell, Miss M.
 1946 Brummitt, Miss G.
 1951 w Bull, A. W. M.
 1922 Burton, E. St. J., F.G.S.,
 F.R.S.A.
 1922*+v Bury, Henry, M.A., F.L.S.,
 F.G.S.
 1930 Bury, Miss G. J.
 1946 Busby, Miss G.
 1952 Butcher, A. J., F.R.I.B.A.
 1945 Butler, G. W.
 1947 Butterworth, J. F.
 1948 Butterworth, E. P.
 1953 Cadwell, W. H., M.I.C.E.
 1953 Cadwell, Mrs. D. A.
 1928 L Calkin, J. B., M.A., F.S.A.
 1934 +v Cameron, Prof. J., M.D., D.Sc.
 1950 Cashmore, Group-Capt. E. M.
 1950 Cashmore, Mrs. A.
 1944 +v Chambers, Ernest, F.L.S.
 1950 Chambers, Mrs.
 1948 Chambers, Miss V.
 1946 Chaplin, W. A.
 1953 Chapman, Mrs.
 1951 w Chase, Miss E.
 1945 Cheesman, Mrs. A.
 1945 Child, Miss L. M.
 Jacaranda, Hayes, Wimborne
 Flat 1, 31 Marlborough Road
 9 Florence Road
 69 Grosvenor Street, London, W.1
 7 Browning Avenue, Boscombe
 The Elms, Wheelers Lane, Knighton,
 Wimborne
 Kinston, Central Avenue, Corfe Mullen
 The Datcha, Compton Drive, Parkstone
 Ardoyne, 19 Cavendish Road
 12 Montague Road, W. Southbourne
 1 Beechwood Avenue, Boscombe
 54 Westby Road, Boscombe
 36 Holdenhurst Avenue
 58 Wellington Road
 32 Ken Road, Southbourne
 Manton Villa, 2 Oxford Road
 81 Lansdowne Road
 454 Christchurch Road, Boscombe
 Stenson, Woodland Way, Highcliffe, Hants
 Three Ways, Dudsbury, Wimborne
 12 Wimborne Road
 7 Windermere Road
 Elderly Nurses' Home, Holdenhurst
 Broom House, Chiltern Road, Hitchin
 St. Anne's, Seaward Avenue, Barton-on-Sea
 The Gate House, 17 Alumdale Road
 4 Harbour Close, Haven Road, Canford
 Cliffs
 Boldine, Golf Links Road, Ferndown
 Old Park Farm, Lytchett Matravers
 2 Forest Road, Branksome Park
 St. Helen's, 238 Higher Blandford Road,
 Broadstone, Dorset
 Virginia House, Langton Matravers
 63 Grove Road
 Windrush, Whitehouse Hill, Wimborne
 39a Queen's Park South Drive
 29 Watcombe Road, Southbourne
 11 Folkestone Road, Harnham, Salisbury
 185 Alma Road, Winton
 Brooklyn, Massachusetts, U.S.A.
 The Ken, Walkford, Christchurch
 37 Sunnyhill Road, W. Southbourne

1912	*Chilver, Miss K. M.	2 Shaftesbury Road
1951	Chomé, E. E. P.	6 Alyth Road
1942	Chomé, Mrs. W.	"
1943	Chomé, Miss E.	"
1943	Chomé, Miss M.	"
1950	Churches, Mrs. E. W., M.B., CH.B.	The White House, Colebrook Street, Winchester
1945	Clarke, H. E., M.A., B.Sc., F.R.I.C.	64b Surrey Road
1945	Clarke, Mrs. M.	"
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts.
1950	Clifford, Miss E. E.	14 Stourcliffe Avenue, Bournemouth
1951	Coe, Mrs. G.	3 Dunbar Road
1946	Cohen, E., F.Z.S., M.B.O.U.	Hazelhurst, Sway
1951	Coleman, F., M.C., M.R.C.S., F.D.S.	Empress Hotel, Exeter Road
1941	Coltar, Miss S. A.	98 The Grove, Redhill Park, Moordown
1926	*Cooper, H. A.	White Lodge, 8 Oban Road
1941	Cooper, Mrs. E. M.	" "
1951	LCooper, Miss R. I.	" "
1945	Cooper-Hunt, Major C. L., M.A., PS.D., MS.D., D.D.	19 Marine Drive East, Barton-on-Sea
1945	Cooper-Hunt, Mrs. E.	" "
1952	Corser, Miss G. M.	8 Redhill Crescent, Moordown
1951	Courtney, F. E.	Municipal College of Art, Bournemouth
1948	Cox, W. S. I., F.R.E.S.	248 Castle Lane
1948	Cox, Mrs.	"
1922	*Crallan, Mrs.	Lansdowne Hotel, Eastbourne
1948	Crawshaw, J. C., A.R.C.O.	Latchmoor Cottage, Riverway, Christ- church
1949	Crawshaw, Mrs.	"
1941	Cresswell, Mrs. S. M.	13 Cecil Court, Charminster Road
1953	Crowe, Mrs. M. L.	13 Beatty Road, Charminster Hill
1950	Cundall, H. L.	105 Hennings Park Road, Poole
1950	Cundall, Mrs. M.	"
1903	*oCurtis, W. Parkinson, F.E.S.	Ladywell Cottage, Tower Road, Brank- some Park
1947	d'Aguilar, Lt.-Col. C. B.	Pavilion Hotel, Bath Road
1940	Dailey, Miss K.	134 Western Avenue, Ensbury Park
1951	Dane, A., B.Sc.	64 R. L. Stevenson Avenue, Bourn- mouth, W.
1950	Davidson, Miss M. S., M.A., B.Sc.	Bournemouth School for Girls, Gervis Road
1951	Davis, Miss G. H.	Moorlands, The Grove, Ferndown
1949	Day, J.	60 Brackendale Road
1952	Day, Mrs. E. T.	60 Brackendale Road
1930	*de Castro, H.	Yarlington, Springdale Avenue, Broadstone
1945	de Jersey, Mrs. D.	98 Pauntley Road, Mudeford, Christchurch
1951	Dennis, Rev. N., S.J.	The Presbytery, Albert Road
1935	Derry, Mrs. E. H.	Charnwood, Belle Vue Road, Southbourne
1947	Dewdney, H. A., F.R.C.O., L.R.A.M.	15 Wellington Road
1949	Dixon, Miss H.	62 Christchurch Road

1950	Down, E. A., F.R.I.C.S., F.F.A.S., M.INST.R.A.	47 Boscombe Overcliff Drive
1950	Down, Mrs. Dorothy I. A.	" "
1950	Down, Peter A.	" "
1950	Down, Miss Rosemary J.	" "
1950	^A Down, Miss Daphne V.	" "
1952	Dransfield, D. C.	Twin Gables, 66 Broadway, Southbourne
1952	Dransfield, Mrs. B. J.	" "
1946	Drew, Lt.-Col. C. D., D.S.O., F.S.A.	Dorset County Museum, "Dorchester
1953	Druitt, Miss C. M.	Avebury, Sandleheath, Fordingbridge, Hants
1953	Dudley, D. J.	17 Widdicombe Avenue, Parkstone, Dorset
1950	Dunn, Addison H.	Baycroft, Central Avenue, Corfe Mullen, Wimborne
1952	Eaton, Miss I.	15 Spur Hill Avenue, Parkstone, Dorset
1953	Eaton, Mrs. V. W.	33 Branksome Wood Road, Bournemouth, W.
1936	Edwards, Charles, M.D.	Lyndon Lodge, 51b Christchurch Road
1936	Edwards, Mrs. H.	" "
1946	Ellison, Prof. F. O'B., M.D., F.R.A.S.	Pine Apple Cottage, Burton
1950	Evans, Mrs. E. E. M., B.A.	113 Western Avenue, Ensbury Park
1951	^w Farish, Mrs. J. J.	42 London Lane, Bromley, Kent
1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone
1922	Farmar, Miss E. A.	" "
1952	Fenton, Mrs. O.	Therapeia, Branksome, "Bournemouth W.
1953	Field, Miss M. L., B.SC.	Bournemouth School for Girls, Gervis Road
1934	Finnis, Miss F. M.	15 Julian's Road, Wimborne
1953	Finter, H. C.	7 Sutton Road, Charminster
1951	^w Fisher, J.	The Old Rectory, Ashton, Northampton
1947	Fletcher, Capt. G.	Avon, Chine Crescent Road
1950	Fletcher, Mrs. V.	" "
1942	Ford, Miss C.	13 Beaufort Road, W. Southbourne
1938	Ford, J. C.	3 Harvey Road, Boscombe
1937	Forrest, Miss C. D.	Hiproof, Benellen Road
1925	Fountain, E. D., L.R.C.P., M.R.C.S.	Vron, 30 Mansfield Road, Parkstone
1952	Foulston, Mrs. G. W.	21a Wayside Road, Southbourne
1945	Foyle, A. A.	24 R. L. Stevenson Avenue
1953	Frampton, Miss S., M.A.	The Hawthorns, Gravel Lane, Ringwood, Hants
1948	Francis, Miss E.	Beverley, Barton Lane, Barton-on-Sea
1952	Francis, Miss E. G.	" "
1949	Francis, Miss E., B.A.	Thrupp Lane, Stroud
1953	Fraser, Miss M. H., B.A.	2 Ken Road, Southbourne
1953	Fyfe, Mrs. S. R.	Cumbrae, Bury Road, Branksome Park
1950	Geer, Miss M. L.	Fircroft Hotel, Owls Road, Boscombe
1952	Genge, G. F. S., M.B., B.S., M.R.C.S., L.R.C.P.	Maybank Hotel, Crescent Road
1953	George, Mrs. G.	26 New Park Road, W. Southbourne
1953	Gidley, Miss M.	2 Ken Road, Southbourne
1951	Goddard, Miss E. F.	Allendale, 215 Holdenhurst Road
1937	Gompel, Mrs. M.	12 Chigwell Road

1949 Goodhart, Mrs. M.
 1942 Gorringer, Miss K.
 1927 *Gorton, B., M.R.C.V.S.
 1951 wGourlay, W. B.
 1948 Grant, Col. T. H.
 1948 Grant, Mrs. F.
 1951 Grantham, Miss W. A.
 1953 Gray, Miss E.
 1944 Greg, Mrs. F.
 1952 Gregory, A. W., A.M.I.E.E.,
 F.R.G.S.
 1948 Griffin, J., M.A.
 1948 Griffin, J. A.
 1941 Gwyther, W. T.

1931 Hamee Mrs. E. M.
 1951 Haines, Miss G. M.
 1951 Haines, Miss R. M.
 1929 L Haines, G. E.
 1953 Hamilton-Brown, J. J.
 1951 Hanbury, Miss O. T.
 1953 Hancock, Mrs. C. E.
 1953 Hardie, Miss N.
 1945 Harding, Mrs. L.
 1951 Harding, R.
 1952 Hardinge, C. H. N.
 1951 Harlock, Miss M. L.
 1953 Harris, Lady A. S.
 1932 *Hatton, Mrs.
 1920 Hawes, Miss.
 1953 Hawes, F. B.

1951 Hawker, Mrs. E.
 1953 Hawkins, W. A., F.CH.S.
 1953 Hawkins, Mrs. A. E.
 1953 Hayes, Mrs. A. P.
 1949 Hayley, Miss V. G.
 1951 Hayman, Mrs. M. S.
 1951 Henderson, J. G.
 1952 Hibberd, Mrs. A. A.
 1952 Hill, S. A., M.I.MECH.I.
 1952 Hill, Mrs. E. S.
 1952 Hilton, Miss D.
 1946 Hilton-Johnson, Miss C.
 1952 Holroyd, G.
 1950 Hook, Oliver, F.Z.S.
 1951 wHughes, T. C., M.A., F.S.A.
 1952 Hunt, W. R., M.P.S., M.S.F.
 1930 Hurt, Miss C. E. C. J.

1952 Imlach, C. M., M.A.
 1952 Imlach, Mrs. M. G., B.A.
 1953 Ireland, J.
 1953 Ireland, Mrs. K.
 1950 Isaacs, Mrs. I. F.

1953 Jackson, Mrs. E. M.
 1948 Jackson, J. O.
 1943 Jaggers, Mrs. E.

West Thorpe, Lymington
 11 Branksome Dene Road, Westbourne
 22 Arnewood Road, West Southbourne
 7 Millington Road, Cambridge
 B35 San Remo Towers, Boscombe

" "
 38 Clifton Road, Parkstone, Dorset
 Edmondsham House, 44 Terrace Road
 9 Hengist Road, Boscombe
 25 Glenmoor Road, Winton

20 St. Ledger's Road

" "
 12 Foxholes Road, Southbourne

Appleslade, Ringwood, Hants

" "
 " "

Corvesgate, Canford Cliffs
 Moorlands, The Grove, Ferndown
 912 Castle Lane East, Iford
 The Old House, 538 Holdenhurst Road
 85b Southbourne Grove
 3 Portchester Road
 26 Egerton Road
 44 Heather View Road, Branksome
 Lockner Holt, Chilworth, Surrey
 Dutch House, Cliff Road, Barton-on-Sea
 The Moorings, 27 Nelson Road
 R.O.S.C.M. Ltd. Laboratory, New Quay
 Road, Hamworthy, Poole
 22 Burnaby Road, Bournemouth, W.
 4a Southbourne Grove, W. Southbourne

" "
 9 Norwich Avenue
 Sandykeld Hall, Manor Road
 38 Queen's Park South Drive
 Monreith Hotel, Exeter Park Road
 13 Lombard Avenue
 Hillside, Elgin Road, Parkstone, Dorset
 " "
 East Dyke, Higher Clovelly, Bideford
 12 Oban Road
 2 Manor Road
 Brackenridge, Sway Road, Brockenhurst
 Oakrigg, Scotsforth, Lancaster
 100 Petersfield Road, Boscombe, E.
 Flat 31, Ingleby, 6 Wimborne Road

Crofton Redcotts, Wimborne, Dorset

" "
 c/o Lloyd's Bank Ltd., Bournemouth

" "
 Southmead, 4 Mountbatten Road

Winter Gardens Hotel
 44 Herberton Road, W. Southbourne
 15 Elmsway, Southbourne

1933 James, Mrs. M. G.
 1947 Jaques, Miss M.
 1945 Jenkins, Miss P.
 1950 Jennings, R. J.
 1950 Jennings, Mrs. G. M.
 1950 Jessop, Miss B. M.
 1930 Jubb, Miss O.

1930 +*Keeble, Sir F. W., C.B.E.,
 D.S.C., F.R.S.
 1953 Keene, Miss K.
 1953 Keene, Miss L.
 1928 Kendall, Miss G. J., A.R.C.M.
 1953 Kiernan, Mrs. A. M.
 1936 King, Mrs. A.
 1946 King, Miss A.
 1944 Kirke, Miss M.
 1948 Knight, Miss A.

1952 Lacey, Miss M. A.
 1951 Lane, A. J.
 1952 Lane, Mrs. L. F.
 1942 Lanham, Miss O.
 1950 Lanning, J. P.
 1950 Lanning, Mrs. C. M.
 1950 Lawton, W. M.
 1951 ^ALawton, J. N.
 1951 ^ALawton, W. N.
 1942 Le Fèvre, Miss W.
 1947 Legat, A. W., M.INST.C.E.
 1947 Legat, Mrs. E.
 1948 Leonard, H. W.
 1948 Leonard, Mrs. N.
 1949 Liddell, D.
 1949 Liddell, Mrs. S.
 1950 Lincolne, Miss H. M.
 1951 Lloyd, G. B., B.A.
 1950 Locke, S. L.
 1950 Locke, Mrs. J. B. E., B.A.
 1947 Logan, Miss A.
 1952 Logie, Mrs. G.
 1947 Lovell, Miss D.
 1939 Lowde, Miss E., B.A.
 1951 ^wLowe, Mrs. D. M.

1934 Lowther, Miss D. M., B.SC.
 1952 Lyall, R. E., M.A.
 1951 ^wLyver, Mrs. D. J.

1951 ^wMacmillan, W. E. F.
 1951 Magee, Mrs. M. L.
 1948 Markwick, Miss D.
 1952 Marsh, K. J. J., L.R.I.B.A.
 1951 Marsh, Mrs. V. M.
 1946 Marshall, Miss D.
 1946 Masters, Mrs. S. M.

70 St. Alban's Avenue
 Croft Cottage, Forest Road
 Hinton St. Michael, Christchurch
 Latymer, 99 Seafield Road, Southbourne
 " "
 27 Southwood Avenue, West Southbourne
 12 Oban Road

Cranley Mansion, Brechin Place, London,
 S.W.7
 62 Belmont Road, Parkstone, Dorset
 " "
 20 Serpentine Road, Poole
 Petersville, 2 Lorne Park Road
 37 Linwood Road
 46 Surrey Road
 Flat 3, 34 Dean Park Road
 Apia, Fairview Road, Broadstone

North Brook, 10a Wimborne Road
 Flat A, 41 Christchurch Road

" "
 31 Gorsehill Road, Poole
 2 Gainslea Court, Derby Road

" "
 Cleeve Court, Knyveton Road

" "
 791a Christchurch Road, Boscombe
 6 Thistlebarrow Road

" "
 1 Neville Court, Derby Road

" "
 22 Marlborough Road

" "
 63 Watcombe Road, Southbourne
 58, Glenferness Avenue
 Northgate, Salisbury Road, Ringwood

" "
 Top Flat, 37 Branksome Wood Road
 179a Richmond Park Road
 33 Commercial Road, Parkstone
 Kilmory, York Road, Broadstone
 43 Marryat Road, Wimbledon, London,
 S.W.19

Lonsdale, Mayfield Avenue, Parkstone
 29 Hawkwood Road, Boscombe
 Grove Lodge, Burgess Hill, Sussex

Botton Hall, Danby, Yorks.
 21 Carbery Avenue, Southbourne
 67 Norton Road, Winton
 Little Place, Harbour Road, Southbourne
 " "
 117 N. Selsden Road, Sanderstead, Surrey
 4 Gorsehill Road, Poole

1939 Newsome, S. H.
1939 Newsome, Mrs.
1943 LNicholls, Miss G.
1953 Northover, Miss W., B.SC.
(London)
1948 North-Row, St. J. K.

1945 Paris, Lt.-Col. A., R.E. (ret'd.)
1951 Parrock, Mrs. L.
1950 Paterson, Miss M. W.
1953 Peel, Mrs. R. A.
1945 Penny, Miss A.
1916 *LPenrose, Miss F.
1916 *LPenrose, Miss M., B.Sc.
1948 Perceval, Mrs. W.
1950 †vPeters, Prof. Sir R. A., M.C.,
M.A., M.D., F.R.S.
1951 Pickard-Cambridge, W. A., M.A.
1951 Pickard-Cambridge, Mrs. H. W.

Strete " Place, St. Peter's Road
Hinton Admiral, Christchurch
Tregenna, Castle Lane
239 Sandbanks Road, Parkstone
109 Edgehill Road
St. Margaret's, Valerie Road
9 Crossway, Christchurch
16 Southern Road, Southbourne
56 Lancaster Gate, London, W.2
64 Fernside Road, Poole
3 Rothenfield Road
9 Warren Edge Road, Southbourne

184 Belle Vue Road, Southbourne
17 Waltham Road "
Bournemouth School for Girls, Gervis
Road
75 Lansdowne Road

Vailima, Fairview Road, Broadstone
30 Grosvenor Court, Vale Road
" " "
Little Wyfold, Frankland Crescent, Park-
stone
B6 San Remo Towers
77 Hengistbury Road, W. Southbourne
" " "
2 Rotherfield Road, Boscombe
" " "

10 Carbery Avenue, Southbourne
Flat 3, 147 Holdenhurst Road
Queenswood School, Hatfield, Herts.
Flat 3, 17 Stourwood Avenue, Southbourne
Cottonwood, E. Cliff
Little Picket, Hightown, Ringwood
" " " "
7 Benellen Avenue
14 Brookside, Headington, Oxford

Brimlands, - Broadstone

- 1946 Pickering, Mrs. G.
 1953 Pickering, V. T.
 1953 Pickering, Mrs. C. G.
 1952 Pierce, E. V.
 1952 Pierce, Mrs. E. L., M.B.E.
 1953 Piggott, H. E., O.B.E., M.A.
 1947 Pope, A. E.
 1946 Prideaux, Mrs. A.
 1946 Prideaux, Miss C.
- 1924 Quick, Mrs.
 1951 wQuillet, L. A.
- 1952 Ramble, Mrs. M.
 1953 Rayment, Miss S. M.
 1946 Rayner, Mrs.
 1951 Rayson, Mrs. M. C. J.
 1945 vRead, W. J., M.SC., F.R.I.C.
 1946 Read, Mrs., F.Z.S.
 1950 Redfern, Rev. L., M.A., B.D.
 1950 Redfern, Mrs. E., M.A.
 1950 Redrupp, Mrs. S. P. J.
 1945 Richards, Miss E., B.SC.
 1942 Richards, Miss M.
 1946 Richardson, J. G.
- 1926 Rix, Miss M. E. de B.
 1949 Robertson, Mrs. M.
 1949 Robertson, Mrs. W.
 1939 Robins, E. A., F.R.P.S., F.L.S.,
 F.R.M.S.
 1953 Robins, F. W., F.S.A., F.R.G.S.
 1923 Roden, Miss E. M.
 1947 Rooke, Dr. K. B., M.B., B.CH.,
 M.B.O.U.
 1935 Rush, Miss C. J.
 1943 Rushton, J.
 1951 Rushton, Mrs. E.
- 1943 Sadler, H. G.
 1951 wSalisbury, Sir E., D.SC., F.R.S.,
 F.L.S.
 1942 Sanford, E. G., A.M.I.MECH.E.,
 A.M.I.E.E.
 1941 Sanford, Mrs. M. A.
 1938 Seare, Mrs. H.
 1953 Seaward, Mrs.
- 1951 wSecretan, S. D.
 1950 Sedgewick, Mrs.
 1941 Sexton, Miss F.
 1951 Sewell, Mrs. I.
 1948 Shears, Miss E.
 1933 Sheffield, Miss I. E.
 1950 Shillidy, G. A., C.I.E.
 1944 LShorthouse, B.
 1937 Simmons, Mrs. I. M.
 1920 Simpson, N. Douglas, M.A.,
 F.L.S., F.R.M.S.
- 23 Danesbury Avenue, Southbourne
 Francesca, Hightown, Ringwood, Hants
 " " " "
 Little Bushey, 63 Leybourne Avenue
 " " " "
 7, Southville Road, Southbourne
 33 Pine Crescent, Highcliffe, Hants.
 Upmoor, Ravine Road, Canford Cliffs
 " " " "
- Tregenna, Castle Lane
 "Sevenoaks," Springfield, Chelmsford
- 100 Wolverton Road, Boscombe
 A7 San Remo Towers, Sea Road, Boscombe
 16 Oban Road
 83 Watcombe Road, Southbourne
 15 Carbery Avenue, Southbourne
- 46 St. " " Luke's Road, Bournemouth
- 21 R. L. " " Stevenson Avenue, Westbourne
 8 Overcliff Mansions, Manor Road
 Stour Lodge, Julian's Road, Wimborne
 Abbotsdene, Seafeld Road, Friars Cliff,
 Christchurch
 Wayside, Stourcliffe Avenue
 41 Christchurch Road
 24 Poole Road
 Fairway, Stanley Road, Waterford, Lym-
 ington
 4 Harewood Avenue, Southbourne
 12 Walpole Road, Boscombe
 Cranborne, Wimborne
- 9 East Avenue
 112 Alumhurst Road
 " "
- Allandale, Knole Road
 Royal Botanic Gardens, Kew, Surrey
 Welbeck, Danecourt Road, Parkstone
- " " " "
 Almer, Blandford
 Stafford House Hotel, Winn Road, South-
 ampton
 Swaines, Rudgwick, Sussex
 Pirbright, West Cliff Gardens
 60 Uplands Road
 Flat 1, 445 Christchurch Road
 24 Poole Road
 177 Richmond Park Road
 35 Barton Court Road, New Milton, Hants.
 Brookside Cottage, Exeter Lane
 Trigonía, Spur Hill Avenue, Parkstone
 Maesbury, 3 Cavendish Road

- 1945 Smith, W. G.
 1953 Smith, Mrs.
 1953 Smith, Mrs. K. A. A.
 1951 Smooker, Miss G. M.
 1951 Smooker, Miss L. G.
 1947 Smythe, V. du B., F.R.N.S.
 1947 Smythe, Mrs. M.
 1947 Sobbe, Miss D.
 1940 Somerville, Mrs. S.
 1952 Spry, Miss A. G., L.L.A.
 1949 Stanton, H. K.
 1953 Stinton, Mr. W. A.
 1947 Stuart-Harris, Miss M., B.SC.
 1946 Stuart-Harris, Miss W., B.SC.
 1942 Styche, Mrs. E. L.
 1953 Sutton, W.
 1953 Sutton, Mrs.
 1950 Swords, Miss R.
 1953 Symonds, Miss V. G.
 1952 Tanner, Miss F. R.
 1952 Taylor, Mrs. F. M.
 1953 Teggin, Mrs. D. M.
 1937 Terrell, G. H.
 1946 Thane, Miss V., M.A.
 1953 Thatcher, Rev. F. M. A.
 1953 Thatcher, Mrs. E.
 1950 Tibbitt, Miss M.
 1951 wTierney, Dr. C.
 1951 wTierney, Mrs.
 1951 wTilling, W. G.
 1951 Tottenham, R. C.
 1936 Trayfoot, Mrs. L. W.
 1944 Turner, Miss E. C.
 1949 *Turner, G. A.
 1953 Uhthoff, R. K., B.A.
 1953 Uhthoff, Mrs. J. F. H.
 1950 Venning, Brig. F. E. W., C.B.,
 C.B.E., D.S.O., M.B.O.U.
 1950 Venning, Mrs. E. L.
 1950 Venning, Miss E. J. L.
 1921 Wales, Miss N.
 1945 Walker, F.
 1945 Waller, Miss C.
 1952 Walls, R. R., M.A., B.SC.,
 F.G.S.E.
 1953 Walters, Miss F. E.
 1951 wWard, W. S.
 1952 Warden, Miss F., M.C.S.P.
 1941 Watson, Miss G. V.
 1941+LWvWatt, Mrs. W. Boyd, F.Z.S.,
 M.B.O.U.
 22 Stanpit, Christchurch.
 22 Stanpit, Christchurch
 14 Southlea Avenue, Southbourne
 5 Meon Road
 " "
 Sherwood, Irving Road, W. Southbourne
 " "
 Manica, Tower Road, Branksome Park
 Rumah Kechil, Pinewood Road, Ferndown
 17 Ravenscourt Road
 1097 Christchurch Road
 32 Withermoor Road, Winton
 Windycroft, Worth Matravers
 " "
 19 Heatherden Avenue, Parkstone
 42 William Road
 " "
 12 Grosvenor Court, Vale Road, Bourne-
 mouth
 1 Lucerne Avenue, W. Southbourne
 11 Springfield Crescent, Parkstone
 20 Egerton Road, Queen's Park
 18 East Avenue, Talbot Woods
 53 Wentworth Avenue, Boscombe
 23 Cecil Court, Charminster Road
 7 Braidley Road
 " "
 F.6 Pine Grange, Bath Road
 Netherton, Coulsdon, Surrey
 " "
 20 Streathbourne Road, Upper Tooting,
 London, S.W.17
 The Elms, Wheeler's Lane, Knighton,
 Wimborne
 25 Eaton Road, Branksome Park
 18 Cassel Avenue, Westbourne
 Winchester House, Fir Vale Road
 15 Rothesay Road
 " "
 Pinewood, Butts Ash, Hythe
 " "
 " "
 " "
 The Nook, 4 Ormonde Road
 57 Richmond Park Avenue
 76 Ensbury Park Road
 Strathyre, 42 Manor Avenue, Parkstone,
 Dorset
 7 Seaward Avenue, W. Southbourne
 44 Lesser Avenue, Clapham Common,
 London, S.W.4
 Flat 3, 69 Seamoor Road, Westbourne
 Manor Lodge, 20 Manor Road
 52 Wimborne Road

- 1946 Watts, Miss N. E.
 1936 Weekes, Mrs. M.
 1951 Wells, G.
 1947 West, Miss G. M.
 1951 ^AWest, I. M.
 1918 *Whitaker, S.
 1924 Whitaker, Miss E. M.
 1924 Whitaker, S. E., P.A.S.I.
 1951 ^wWhite, Miss C.
 1951 White, Miss H. A.
 1931 ^AWhite, S. J.
 1950 ^AWhitelaw, P.
 1953 ^AWilliams, Miss A.
 1952 Williams, P.
 1952 Williams, Mrs. W. M.
 1942 [†]Williamson, F., F.R.HIST.S.
 1953 Wilmott, Miss A. E., M.A.,
 A.K.C.
 1947 Wilson, Miss G.
 1950 Winter, W. P., B.SC.
 1951 Winter, Mrs. W. P.
 1950 Wiseman, Capt. L. G., O.B.E.
 1948 ^AWood, Miss B., B.SC.
 1951 ^wWood, Mrs. L.
 1950 Wood, Miss L.
 1903^{†ov}Woodhouse, W. J., A.C.P.,
 M.I.H.
 1953 Wootton, Miss E. M.
 1949 Wray, D. A., M.SC., PH.D.,
 F.G.S.
 1949 Wray, Mrs. A.
 1932 *Wren, G. G.
 1946 Wycherley, Mrs. L.
- 3 Dunbar Road
 3 Rotherfield Road, Boscombe
 26 Dingle Road, Boscombe
 1 Lucerne Avenue, Southbourne
 30 Wildown Road, Southbourne
 22 Somerset Road, Boscombe
 " "
 22 Selwood Road, Addiscombe, Croydon
 33 Manor Road, Bexhill-on-Sea
 Little Place, Harbour Road, Southbourne
 7 Gilbert Road
 18 Beechwood Avenue, Boscombe
 12 Stevenson Crescent, Parkstone, Dorset
 Woodend Forest Corner, Ringwood
 " "
 24a Rushton Crescent
 27 Southbourne Overcliff Drive
 9 Glenmoor Road, Winton
 Latimer House, 27 Horsa Road
 " "
 Avon Private Hotel, 4 Chine Crescent Road
 4 New Park Road, W. Southbourne
 The Oaks, Sawbridgeworth, Herts.
 223 Sandbanks Road, Parkstone, Dorset
 29 Twynham Road, Southbourne
 3 Holmwood, Castle Hill, Parkstone
 42 Canford Cliffs Road
 " "
 420 Charminster Road
 40 Littledown Avenue, Queen's Park

BOURNEMOUTH NATURAL SCIENCE SOCIETY

Summary of the Accounts for the Year ending 30th September, 1953

Receipts.				Payments.			
1952	1st October, 1953.	£	s. d.	1952	Repaid to Hon. Treasurer 1952 Account	£	s. d.
£	s. d.	£	s. d.	£	s. d.	£	s. d.
524 0 0	Balance at Bank 30th Sept., 1952	335 16 4		138 7 6	Rates	8 3 4	
28 15 0	Subscriptions to 30th Sept., 1953	481 7 6		584 15 9	Repairs	148 12 6	
	Subscriptions year 1953-54	42 10 0		94 11 11	Maintenance	1246 12 0	
				20 5 3	Insurance	480 3 2	
						22 1 3	
	Rents :—					502 4 5	
100 0 0	Royal Empire Society	100 0 0			Caretaker Wages and Insurance	87 9 6	
54 0 0	Camera Club	69 5 0		80 10 0	Library (including removal, insurance and storage of books)		
4 19 0	Hire of Hall	4 18 0			Garden and Maintenance	14 3 9	
34 19 11	Garden Parties	32 12 5			Coal	45 4 1	
19 7 6	New Year Party	9 12 2			Electricity	156 4 8	
	Lecture, Prof. Huxley's	35 14 6			Gas	4 10 2	
					Water		
12 19 4	Teas	12 7 11				220 2 8	
4 1 0	Field Meetings	9 6 6					
59 4 0	Donations	21 14 5					
21 0 0	Interest on Investments	97 1 0		85 6 8	Printing and Stationery	126 1 1	
93 3 3	Income Tax Refunded	69 5 8		75 5 6	Proceedings	99 4 0	
4 16 2	Gas : Royal Empire Society	123 16 1		31 10 11	Postage	29 7 4	
1 9 7	Telephone	1 17 9		11 4 1	Telephone	14 14 11	
1 16 6	Sundries	2 15 3				269 7 4	
		3 1 0			Museum	20 7 7	

Transfer from Twemlow
Bequest Fund ...

613 3 5
574 0 0

1115 13 6

1187 3 5

Sale of 2½% Treasury Stock

605 8 6

Subscriptions to other
Societies ...
Jubilee Expenses, etc. ...

12 8 0
53 15 5

Balance at Bank 30th
Sept., 1953 ...
Less due to Hon. Treas-
urer ...

577 18 4
3 12 11

326 3 0

574 5 5

Accounts due for payment
as on 30th Sept., 1953,
and passed by Council:
£62 9 10

£3223 19 0

£3223 19 0

17

We have examined the above accounts with the Books of the Society and the Vouchers for payment and certify the same to be correct.

H. C. MAYO

F. OGDEN

} Hon. Auditors.

WILLIAM J. WOODHOUSE,

Hon. Treasurer.

Bournemouth, 16th October, 1953.

ARCHAEOLOGICAL RESEARCH FUND (DEPOSIT ACCOUNT).

	£	s.	d.		£	s.	d.
Balance 30th September, 1952	...	...	10 17 5	Balance 30th September, 1953	...	...	11 0 10
Interest	...	...	3 5				
			<u>£11 0 10</u>				<u>£11 0 10</u>

DEPOSIT ACCOUNT.

	£	s.	d.		£	s.	d.
Balance 30th September, 1952	...	...	11 66 16 6	Transfers to Current A/c.	...	...	613 3 5
Credited from Current A/c.	...	...	7 17 6				574 0 0
Interest	...	...	20 12 7	Balance 30th September, 1953	...	...	8 3 2
			<u>£11 95 6 7</u>				<u>£11 95 6 7</u>

INVESTMENTS.

	Cost.	Approximate Value 30th Sept., 1953
	£ s. d.	£ s. d.
£1,000 3% Defence Bonds	993 19 0	1,000 0 0
£1,000 3% British Transport Stock	775 4 0	839 0 0
£1,000 4½% British Electricity Stock	992 1 6	1,019 0 0
	<u>£2,761 4 6</u>	<u>£2,858 0 0</u>

Council's Report for the year ending 30th September 1953

The following figures of membership will probably be of interest to members :—

	1953	1952
Membership at end of year ...	465	494
Joined during the year ...	67	116
Resignations, Deaths, or Removed from list under Rule 9 ...	96	67

The Council regrets to report the loss of the following members through death :—Miss Careless, Miss M. W. Dunton, Mrs. G. Gamble, Mr. W. G. Harding, Dr. R. G. Henderson, Mr. G. H. Isaacs, Miss E. M. Jackson, Miss A. Parnell Jones, Miss F. M. Pullman, Mr. R. A. Rayner, Mrs. E. M. Reid, Miss A. M. Retzbach, Miss M. H. Robinson, Mr. G. E. Wilson.

There were no changes in the list of Officers and Council of the Society during the year under review.

The Annual General Meeting was held on 15th November, 1952, when the following past presidents were elected vice-presidents :—Mr. Ernest Chambers, F.L.S., Sir Rudolph Peters, M.C., M.A., M.D., F.R.S., Prof. G. D. Hale Carpenter, M.B.E., D.M., F.L.S., and Lt.-Col. C. D. Drew, D.S.O., F.S.A. Mr. W. J. Read, M.Sc., F.R.I.C., was also elected a vice-president. Prof. Hale Carpenter died in January, 1953, and an obituary notice appeared in the last number of the *Proceedings*.

The President for 1952-53, Mr. F. Williamson, F.R.Hist.S., delivered his presidential address on "The Origin of Hampshire", on October 25th, 1952, to a large and appreciative audience. The address was printed in our last issue.

The Society's activities for the year comprised 79 indoor meetings and 61 field meetings. Included in the former were 61 afternoon lectures, six evening lectures open to the public and twelve club days. The planning and carrying out of such a series is, of course, only possible because of the excellent team work behind it. The Council wishes to convey the thanks of the Society to all who contributed to this remarkable achievement: to the Chairmen of Sections who draw up the programmes, to the programme secretary, to the ladies who address and send out copies to members six times a year, to all the lecturers and leaders of excursions and to the panel of projectionists. It is pleasing to record the emergence of new lecturers and new leaders during the last year, for only by new members coming forward to take up the work in turn can such varied activities be continued.

A most useful addition to our lecture equipment is the speech amplification system. When it was decided to instal this, the first tests met with a great many difficulties. Mr. A. W. Legat devoted much time to experimenting with different types of microphone and different placings of the loud speakers, persisting over some months, until the most satisfactory conditions were found. The Society is very grateful to him for the energy and ability with which he tackled this problem and for all the trouble he has taken in completing the new projection equipment. Mr. W. G. Smith very kindly made the cupboards for the safe storage of all this apparatus.

The Ladies' Tea Committee continued to serve us well, not only in providing a welcome opportunity for refreshment and comment after lectures, but in handling the considerable task of catering for two large garden parties and the New Year party. The Council wishes also to thank the Entertainment Committee for organising the parties and seeing them through so successfully.

From April 27 to May 2, 1953, special arrangements were made to celebrate the fiftieth anniversary of the founding of the Society. A detailed account appears elsewhere in this issue.

For the third year in succession, members of the Society gave Sunday evening talks on the natural history of the district to the boys and girls at the Wick Ferry School Journey Centre, some of them also acting as guides on local excursions. Mr. Chambers arranged the programme, while Mr. Woodhouse lent and operated the lantern as in previous years. The lecturers were Messrs. Brown, Chambers, Smythe, Williamson and Woodhouse.

Mr. F. Williamson, during his year as president of the Society, continued his valuable services as curator. As a result, the museum is better known and better used than ever before. Much of the curator's work is never seen by members. Prosaic tasks such as dusting and cleaning cases of specimens, labelling and arranging exhibits, make very little show and consume a good deal of time. It is good to know that more members are coming forward to give a hand in these necessary operations. The Society owes much to Mr. Williamson and his team.

The Council has again to record numerous donations by members and others to the museum, the library, the lantern-slide collection and the Society's funds. It is impossible to enumerate all these benefactors and it would be invidious to select. The Council desires to thank them all most sincerely on behalf of the members.

To the Librarian and his assistant, the Library Committee, the Garden Committee and all their willing helpers, the Council desires to render thanks for the efficient way in which they have worked for the Society.

The Council has continued the task of putting the premises into a satisfactory state of repair. The whole exterior of the building has been re-painted and the drive has been completely re-surfaced. Interior cleaning and decoration have been carried out in the entrance hall, the lecture hall and the museum. It is the aim of the Council so to re-condition the property that it can be kept in good repair by constant attention and moderate expenditure in future.

The Council owes a special debt of gratitude to the honorary secretary, Mr. W. S. Brown, not only for his efficient initiative and services in that office, but for the outstanding work he has performed in connection with the repairs and decorations just referred to.

In conclusion, this report may well repeat the last paragraph of the Council's report in the first number of the Proceedings, 1909.

“ If each member of the Society in his or her own sphere does his or her best to recruit new members as opportunity offers, and to contribute something original in the way of scientific papers, lectures, notes, or gifts of specimens, etc., we are confident that the Society has a long period of activity and usefulness before it.”

Programme of the Society's Activities, 1952-1953

(1) GENERAL AND NON-SECTIONAL.

1952

- Oct. 25th. Presidential Address: "The Origin of Hampshire",
by F. Williamson, F.R.Hist.S.
Nov. 19th. Annual General Meeting.

Entertainments.

1953

- Jan. 3rd. New Year Party.
Sept. 5th. Garden Party.

Open Public Meetings (Evening Lectures).

1952

- Oct. 29th. "More about Old Bournemouth,"
by W. J. Woodhouse, A.C.P.
Nov. 19th. "Snowdonia," by V. du Bédat Smythe, F.R.N.S.
Dec. 17th. "Egypt: Ancient and Modern,"
by Professor J. Cameron, M.D., D.Sc.

1953

- Jan. 21st. "The Natural History of Chocolate,"
by E. Chambers, F.L.S.
Feb. 18th. "Some Leaders in Nineteenth Century Science,"
by H. E. Clarke, M.A., B.Sc., F.R.I.C.
Mar. 18th. "Canford Magna: A Study of a Village Church,"
by W. S. Brown, B.Sc.
May 1st. "Evolution and Human Destiny,"
by Dr. Julian S. Huxley (Jubilee Address—Held at
3 o'clock in Winter Gardens).

Club Days.

Twelve Club Days were held during the Session (one in each month) at which there were talks and discussions upon the following subjects:—

Botany, by Ernest Chambers, W. S. Brown and other members.
Natural History, led by W. S. Brown with contributions by other members.

Specimens in Museum, led by W. S. Brown with contributions by other members.

English Cattle, by H. de Castro.

"Past and Future Activities of the Society," at which meeting members expressed their views and offered suggestions.

Exhibition of Botanical Specimens throughout the Session by Miss L. M. Child.

(2) SECTIONAL.

Note:—Field Meetings by Coach are marked (C).
Field Meetings by Train are marked (T).
Field Meetings by Water are marked (W).
Names of Leaders are shown in brackets.

Archaeology and History.

1952

- Nov. 20th. "Glastonbury: The Place, its History and Legends," by Miss M. R. M. Bone.
 Nov. 27th. "Northward with the Legions,"
 by F. W. Robins, F.S.A., F.R.G.S.
 Dec. 11th. "Furniture: The Service of the Table,"
 by T. H. Bickel.
 Dec. 17th. "Egypt: Ancient and Modern,"
 by Professor Cameron.

1953

- Feb. 21st. "Anglo - Saxon Crosses and other Sculptured
 Stones," by F. Williamson, F.R.Hist.S.
 Mar. 19th. "The Art of the Misericord,"
 by E. A. Robins, F.R.P.S., F.L.S., F.R.M.S.
 May 26th. "The Hand of the Potter,"
 by F. W. Robins, F.S.A., F.R.G.S.
 May 30th. Wareham: A Saxon Walled Town
 (F. Williamson).
 July 24th. (C) Avebury (F. Williamson).

Astronomy.

1952

- Nov. 8th. (Jointly with History) "The Gregorian Calendar,"
 by W. P. Winter, B.Sc.
 "The Dating of Documents," by F. Williamson.
 Dec. 16th. "Radar in Astronomy," Part 1, by W. P. Winter.
 1953
 Jan. 31st. "Radar in Astronomy," Part 2, by W. P. Winter.
 Feb. 17th. "Mars," by W. P. Winter.
 Mar. 21st. "The Moon," by W. H. Day.

Botany.

1952

- Sept. 10th. New Forest in Search of Bog Plants (Miss Penrose).
 Sept. 16th. Mudeford to Hengistbury Head
 (Miss K. Gorringer).
 Sept. 25th. Woodtown Gardens (Miss Chilver).
 Sept. 30th. Scotland Farm (W. S. Brown).
 Oct. 15th. Fungus Foray at Morden Park
 (Mr. & Mrs. Belcher).
 Oct. 18th. Stoney Down to Corfe Mullen (Miss Lanham).
 Nov. 13th. (C) New Forest for Autumn Tints, Fungi, etc.
 (The Misses Penrose).
 Nov. 29th. "The Grass Family and Man," by E. Chambers.
 1953
 Feb. 7th. "The New Forest As I See It,"
 by Brigadier F. E. W. Venning, C.B., C.B.E.,
 D.S.O.

- Mar. 3rd. (C) (Jointly with Zoology) Radipole Lake, Weymouth (Miss Banham and J. Rushton).
- Mar. 14th. "Some Problems in the Study of Local Bogs," by J. H. Lavender, B.Sc., A.R.C.S.
- Mar. 24th. (Jointly with Zoology) Hinton Admiral (W. S. Brown).
- Apr. 25th. Tamphill and Cowgrove (Miss Gorringe).
- May 7th. (Jointly with Zoology) Coy Pond and Neighbourhood (Miss Chilver).
- May 12th. Colewood, Wool (W. S. Brown).
- May 23rd. (C) Furzey Gardens and Ocknell Pond and Wood (Mrs. and Miss Haines).
- May 28th. Ellingham and Harbridge (Miss Frampton and Miss White).
- June 6th. Town Common and Coward's Marsh (W. G. Smith).
- June 9th. Bloxworth to Bere Regis (W. S. Brown).
- June 13th. (Jointly with Zoology) Littlesea Area (Miss Graham and Miss Davidson).
- June 16th. (Jointly with Geography) Canford Heath (H. de Castro).
- June 20th. (C) (Jointly with Zoology) Iwerne Minster (Miss Child and H. V. Moore).
- June 24th. Corfe, East Hill (Miss Ogden).
- June 27th. Station Heath, Hinton Admiral (Miss Child and Miss Jenkins).
- July 2nd. (Jointly with Zoology) Ballard Down (Miss Ogle).
- July 4th. Spettisbury (Mrs. James).
- July 8th. (T) (Jointly with Zoology) Durlston Head and Downs (Miss Gorringe).
- July 14th. (T) (Jointly with Zoology) Royden Woods, Brockenhurst (W. G. Smith).
- July 18th. (T) Holmsley (Miss Jenkins).
- July 22nd. Lytchett Matravers (H. C. Mayo).
- July 27th. (T) (Jointly with Zoology) Beaulieu Road Station (Brigadier Venning).
- July 31st. Avon Common (J. H. Lavender).
- Aug. 5th. (Jointly with Zoology) Purewell to Winton (W. G. Smith).
- Aug. 7th. (C) New Forest and Lepe (Brigadier Venning).
- Aug. 11th. (Jointly with Zoology) Christchurch Meadows (Mrs. Boyd Watt).
- Aug. 13th. Marlborough Deep (Miss Jenkins).
- Aug. 18th. Parkstone Golf Links (W. S. Brown).
- Aug. 21st. (T) Holmsley (Miss Jenkins for J. H. Lavender).
- Aug. 25th. Morden Park and Woolsbarrow (Mr. and Mrs. Belcher).
- Aug. 28th. (Jointly with Zoology) Across the Heath to Corfe (Miss Ogle and V. du B. Smythe).

- Sept. 1st. (T) Blashenwell (Miss Ogden).
 Sept. 11th. Mudeford to Hengistbury Head (Miss Gorringe).
 Sept. 19th. (Jointly with Zoology) Agglestone, Studland
 (V. du B. Smythe).
 Sept. 22nd. Canford Heath and Stoa Hill (H. de Castro).
 Sept. 24th. (Jointly with Zoology) Bickton Mill and Meadows
 (Mrs. Marsh and Miss Frampton).

Entomology.

1952

- Dec. 13th. 'Butterfly Habits,' by W. S. I. Cox.
'Rearing Lepidoptera,' by V. du B. Smythe.

1953

- Jan. 15th. (Jointly with Microscopy). 'Some Microscopical Aspects of Insect Morphology,' Part 1, by J. H. Murgatroyd.
- Jan. 17th. 'Experiments with Bees,' by H. Bury.
- Apr. 16th. (Jointly with Microscopy). 'Some Microscopical Aspects of Insect Physiology,' Part 2, by J. H. Murgatroyd.

Geography.

1952

- Sept. 24th. (C). Villages in Central Dorset (H. de Castro).
Oct. 23rd. (C). Villages of the Manston River (H. de Castro).
Dec. 4th. (Jointly with Photography). 'Spain,'
by Miss A. E. Wilmott, M.A.
Dec. 9th. 'Off the Beaten Track,' by E. Chambers.

1953

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| Jan. | 1st. | (Jointly with Photography). 'The Thames in Colour,' Part 1, by A. W. Legat. |
| Jan. | 10th. | 'Athens,' by Professor J. Cameron. |
| Jan. | 13th. | (Jointly with Photography). 'The Thames in Colour,' Part 2, by A. W. Legat. |
| Jan. | 24th. | (Jointly with Geology). 'Explorations in Africa before the Advent of Planes and Motors,' by D. A. Wray. |
| Feb. | 5th. | (Jointly with Photography). 'The Wessex of Thomas Hardy,' by S. J. White. |
| Mar. | 5th. | (Jointly with Photography). 'Through the Lands of the Bible,' by Group Captain E. M. Cashmore. |
| Apr. | 2nd. | (Jointly with Photography) 'More Excursion Memories in Colour,' by A. W. Legat. |
| May | 14th. | (C). Apple Blossom in Somerset (H. de Castro). |
| June | 30th. | (C). Corsham Court, Wilts (H. de Castro). |
| July | 11th. | (C). Ford Abbey, Dorset (H. de Castro and J. H. Bailey). |
| Aug. | 18th. | (C). Bignor Roman Villa (W. J. Woodhouse and H. de Castro). |
| Sept. | 15th. | (C). Sydling St. Nicholas and Winyards Cap (H. de Castro). |

1952

Geology.

- Sept. 12th. Barton and Hordle Cliffs (E. St. J. Burton).
 Nov. 22nd. (Jointly with Geography). 'The Origin of Lakes, Lochs and Tarns,' by D. A. Wray.

1953

- Feb. 24th. 'Sand: Its Features and Formation,'
 by W. J. Woodhouse.
 Apr. 18th. (Jointly with Geography). 'A Greenhorn in Brazil,' by R. R. Walls, M.A., B.Sc., F.G.S.E.
 June 11th. (C). (Jointly with Geography). Durdle Door, Ham-
 bury Tout and Lulworth Cove (D. A. Wray).
 Sept. 8th. Highcliffe and Barton-on-Sea (E. St. J. Burton).

Microscopy.

See Meetings with Entomology (Jan. 15th and April 16th, 1953).

1952

Photography.

- Oct. 14th. (Jointly with Geography). 'Life in Madeira,'
 by Miss I. Binks.
 Nov. 10th. 'Early Colour Photography,' by the Misses Penrose.
 1953
 Feb. 10th. (Jointly with Geography). 'The Blandford Story,'
 by A. Avenell, A.R.I.B.A.
 Feb. 12th. 'Snapshot Album,' by Various Members.
 Mar. 4th. (Jointly with Zoology). 'Lets go to the Dogs,'
 by Miss U. Ogle.
 Mar. 10th. Cine Films in Colour, by courtesy of Kodak, Ltd.
 Apr. 21st. 'Gilbert White and Selborne,' by A. W. Legat.

1952

Physics and Chemistry.

- Oct. 4th. 'A Survey of the Chemical Elements,'
 by H. E. Clarke.
 Dec. 6th. 'Photosynthesis,' by H. E. Clarke.
 1953
 Jan. 8th. 'Minerals in Industry,' by H. E. Clarke.
 Feb. 19th. Poole Pottery (H. E. Clarke).
 Mar. 7th. A Symposium on Food and Nutrition: Introductory
 talks by Miss D. M. Lowther, F. Coleman and
 W. R. Hunt.
 Apr. 4th. 'History of Inhalation Anæsthesia,' by F. Coleman.

Zoology.

- Sept. 20th. (Jointly with Botany). Across the Heath to Corfe
 (Miss U. Ogle and V. du B. Smythe).
 Sept. 22nd. (Jointly with Botany). Hinton Admiral and Walk-
 ford (W. G. Smith).

- Oct. 2nd. Studland Heath for Bird Watching
(Miss H. Brotherton).
- Oct. 11th. (Jointly with Botany). Agglestone
(V. du B. Smythe).
- Oct. 28th. 'British Mammals,' by B. Gorton.
- Nov. 12th. 'A Naturalist on the Amazon,'
by E. A. Robins, F.R.P.S., F.L.S., F.R.M.S.
- Nov. 18th. 'Notes on the Senses and Behaviour of Animals,'
by H. Bury.
- Nov. 25th. 'Some Birds of the New Forest,' by P. Day.
- Dec. 20th. 'The Life of the Salmon,'
by J. D. Brayshaw, M.A.
- Dec. 30th. 'Gannets,' by V. du B. Smythe.
- 1953
- Jan. 22nd. 'Wild Life in Ceylon,' by J. Rushton.
- Jan. 30th. Poole Harbour for Winter Migrants
(V. du B. Smythe).
- Feb. 14th. 'Some Birds and their Song,' by W. S. Brown.
- Feb. 28th. Poole Harbour for Winter Migrants
(V. du B. Smythe).
- Mar. 11th. 'The Ecology of the Partridge,' by A. D. Middleton.
- Mar. 28th. Stanpit Marshes for Bird Study (W. G. Smith).
- Apr. 11th. (C). (Jointly with Botany). Bryanstone School
Ground (Mrs. John Beale).
- Apr. 14th. 'Lions, Tigers and Bears,' by B. Gorton.
- May 9th. (Jointly with Botany). Shell Bay to Studland
(Miss Banham and V. du B. Smythe).
- June 4th. (C). (Jointly with Botany). Beaulieu and Pig Bush
(Brigadier F. E. W. Venning).

Summary of Sectional Meetings

(Oct. 1st, 1952—Sept. 30th, 1953).

Archæology and History	...	...	9
Astronomy	...	...	5
Botany	...	...	39
Entomology	...	...	4
Geography	...	...	16
Geology	...	...	6
Photography	...	...	7
Physics and Chemistry	...	...	6
Zoology	...	...	20
Total			112

Forty of these were Joint Meetings of two or more Sections.

Note.—September Meetings during 1952 are included, as they were omitted from *Proceedings* of Previous Year.

Report of Sections for the year ending September 30th, 1953

Library

All the books and periodicals, which were removed in September 1952, to Allen's repository, while the ceiling of the Library was being renewed, were returned by December of that year, forty-two cases of books. As indicated in the Library Report in the 1951-52 *Proceedings*, they have now been arranged on the shelves in the order of the various Sections of the Society, with these exceptions, viz., Archaeology precedes History (both lettered "H"), Entomology is a sub-section of Zoology (lettered "Z"), and Geography is combined with Travel (lettered "T"). There are two large additional Sections, viz., Biography (lettered "F") and Nature Study (lettered "N"). Each Section is divided into its respective Subjects.

A great deal of assistance was given by Mr. Williamson in unpacking the cases and placing the books on the shelves. Other members also helped, to all of whom thanks are due.

The Card Index has been re-arranged according to the "Sears" classification. The Hon. Librarian is indebted to Mr. Williamson for having entirely undertaken this work.

Owing to the Library being out of use for three months, the number of books and periodicals borrowed during the year 1952-53 was only 276, as against 403 for the previous year. There is now a very good range of recently published books, covering all the Sections of the Society, and members are invited to make full use of the borrowing facilities.

The thanks of the Society are due to the following members and friends for gifts of 26 books and a number of periodicals, viz., Miss Binks, Mr. Bury, Miss Busby, Mr. Cheeseman, Miss Child, Mr. Coleman, Dr. Fountain, Mrs. Hill, Mrs. King, Miss Lowther, Miss Penrose, Mr. and Mrs. Read, Miss Sheffield, Mrs. Boyd Watt, Miss Watts and the Reading Circle for "British Birds."

Miss Penrose has continued to present to the Society, which she has done for many years, "Nature," "The Geographical Magazine," "The Journal of the Royal Horticultural Society," and recently, "Oryx."

Mr. Coleman has again helped in the Library, and Mrs. Perceval, Hon. Assistant Librarian, has done very useful work.

The following additional Societies, etc., are now sending us their publications in exchange for our *Proceedings*, viz.:—

Belfast Naturalists' Field Club.

Birmingham Natural History and Philosophical Society.

Lund, Sweden, University Library.

Southampton University College.

Zoological Society of London.

The University of Notre Dame, Indiana, however, has ceased

to send us their publication, "American Midland Naturalist," owing to "inflationary costs."

The following 10 books and 3 maps have been purchased:—

Climate and the British Scene. G. Manley.

Drawings of British Plants. S. Ross-Craig.

Dorset (West), Vol. I. Royal Commission on Historical Monuments.

Flowers of the Coast. I. Hepburn.

Evolution in Action. J. Huxley.

Introduction to the Archaeology of Wiltshire. M. E. Cunningham.

Astronomy for Everyman. M. Davidson (Editor).

Bird Migrants. E. Sims.

The Principles of Insect Physiology. V. B. Wigglesworth.

British Birds, Vol. 41, 1948 (to replace missing volume).

Ordnance Survey Maps:—

Ancient Britain, North Sheet.

Geological, Great Britain, North and South Sheets.

Museum

Work has gone on steadily during the year and the various collections are gradually being overhauled, re-labelled, cleaned and generally made more useful to members.

What was the ladies' cloakroom has been converted into a Botany Room under Miss Child's supervision, and all the Society's botanical material is housed in the one room. An exhibition of fresh plants has been on show during the summer, and a show-case has been set up for the display of models of edible fungi. The walls have been lined with soft wall-board on which diagrams and drawings of botanical subjects can be exhibited. Mr. C. C. Mountford has given a considerable number of specimens for the herbarium, which have been incorporated with the general collection.

The case in the Museum containing specimens of all the British species of the Crow family has been completely overhauled, and fresh specimens put in where required.

The cabinet of foreign shells presented by the late Dr. Crallan is being worked on by Mr. V. A. G. Brown, who is cleaning the specimens and re-labelling them according to the most recent nomenclature.

A number of small British mammals has been purchased, and it is the intention to extend this series as opportunity offers.

All the cases in the Archaeological Room have been cleaned out and the specimens re-arranged, but many new labels are required to add interest to the display.

Additions have been made to the lantern slides by Mr. Murgatroyd (62 in number), Mr. C. C. Mountford (80), and

Major Dugmore (several hundreds). Mrs. Wycherey has presented about 2,000 photographs of geographical subjects. A start has been made in getting together a collection of pictures for use with the epidiascope, to be arranged under their various subjects to facilitate reference.

The Hon. Curator has much pleasure in acknowledging the help he has received from many members of the Society, among whom the following have attended regularly:—Miss Child, Miss Gear and Mrs. Lanning. Work can be found for more volunteers, and particularly for someone who can label specimens.

F. WILLIAMSON.

Garden

Gifts of plants have been gratefully received from Mrs. Brown, Mrs. Cresswell, Miss Lincoln, Miss Lowther, Mr. and Mrs. Mayo, Miss Sheffield, Miss White and Mr. Bailey.

To the customary attractiveness of Mr. and Mrs. Leonard's flower-bed, Roses, Coreopsis and Hibiscus have greatly contributed. In the same flower-bed a Mimosa tree, after several years of growth, is now flowering freely.

To cope with the weeds and increasing number of Sycamore seedlings, Miss Banham has organised weekly weeding parties.

H. G. SADLER.

Archaeology and History

Two field meetings of special archaeological interest were held, the first one in May to Wareham, when the Chairman of the Section acted as guide to this interesting old town. The Saxon church of St. Martin was first inspected and the special Saxon features pointed out. A tour of the North and East Walls followed, where the Chairman pointed out the fact that the walls did not completely surround the town, as the wall petered out before the river Frome was reached and was not continued along the south side. St. Peter's Church was visited, and also the grounds of Castle Close, where Mr. H. J. S. Clark met the party and kindly explained the nature of the foundations of Norman keep which his own excavations had revealed. Until Mr. Clark carried out his excavations there was no real evidence that the castle of Wareham had ever been more than a timbered structure of the motte and bailey type.

In July the Society visited Avebury again under the leadership of the Chairman. Britford Church, a few miles south of Salisbury, was the first place to be inspected, where the leader pointed out two Saxon doorways in the Nave, which had probably opened out originally into small side chapels or porticoes. The opening on the north side has jambs with sculptured vine-scrolls of Saxon date, which are of especial interest as being

among the few Saxon carvings still *in situ*. The following places of interest were seen or inspected during the day :—Woodhenge, Old Sarum, the Sanctuary, Silbury Hill, the West Kennet Avenue, Avebury stone circle, the Morven Museum, Avebury church, and on the way home a stop was made at Stonehenge, where the party was conducted round by the official guide, who pointed out the recently discovered carvings of a dagger and axe on one of the large sarsen stones. The weather was exceptionally fine, and all present voted it a memorable outing.

A considerable number of lectures were given during the winter months, all of which are duly recorded on another page, so that there is no need to repeat the list, but the Chairman would like to thank all those who so kindly helped to make a knowledge of archaeological subjects more widely extended.

During the year the British Museum has again conducted a six weeks course of excavations at Hod Hill under the superintendence of Prof. Ian Richmond, of King's College, Newcastle, with the object of discovering the lay-out of this first century Roman fort. It is understood that work will be continued next year.

Excavations have also taken place on the walls of Wareham by the Royal Commission for Ancient Monuments, but in the absence of a published report the results cannot be stated.

F. WILLIAMSON.

Astronomy

Five lectures were delivered during this session, the first being on the Gregorian Calendar, the bicentenary of the introduction of which into Great Britain occurred during 1952. The Historical Section collaborated on this occasion, Mr. Williamson speaking on Mediaeval Dating of Documents. Two lectures were delivered by the Section's Chairman on Radio Astronomy, in which the work done in recent years by the Universities of Manchester and Cambridge on the application of radar technique to astronomy was outlined. Stress was laid on the importance of the method for detection of meteor streams and the computation of their orbits. In a further lecture on this subject an account was given of work on aurorae, "lunar echoes" and the detection of Hertzian radiation from "radio stars." In March a lecture was given on Mars, illustrated by drawings and photographs from the days of Schiaparelli to those of De Vaucouleur and Dollfuss at the Pic du Midi.

In April the Society welcomed Mr. W. H. Day, F.R.A.S., who gave us a most interesting lecture on the Moon, illustrated by his own slides and exhibited the most recent lunar map, partly based upon, and now superseding, that of the late Mr. Goodacre, a past president of the B.N.S.S.

W. P. WINTER.

Botany

Well attended Field Meetings covered interesting old routes and such noteworthy additions as visits to Bryanstone and Claysmore Schools and grounds (by kind permission), Furzy Gardens, Avon Common and Lepe. The Fungus Foray, arranged by Brig. Venning in conjunction with the Hampshire Field Club, held at Clay Hill, was especially instructive as members had the kind services of Mr. A. A. Pearson, President of the British Mycological Society, and Dr. Dennis, of Kew, for identification. The specimens were later exhibited at the Verderers' Hall, kindly lent for the occasion. More than seventy species were collected and identified. (Full list in Botany Records.)

During the season members, including Miss E. R. Banham, H. Bury, Miss G. M. Haines, Miss K. Gorringer, W. G. Smith and F. E. W. Venning, have recorded the following uncommon plants in new or re-established sites. Particulars are in the Section's Records:—

Within our usual area:—*Aquilegia vulgaris*, *Barbarea stricta*, *Acaena anserinifolia*, *Potentilla argentea*, *Sambucus ebulus*, *Hieracium praecox* (much increased), *Galinsoga parviflora*, *Calystegia sylvestris*, *Chenopodium capitatum*, *Polypogon monspeliensis*, *Botrychium lunaria*.

Further afield:—*Myosurus minimus*, *Draba aizoides*, *Lathyrus nissolia*, *L. sylvestris*, *Vicia lutea*, *V. sylvatica*, *Cephalanthera longifolia*, *Herminium monorchis*, *Orchis hircina*, *Tulipa sylvestris*.

Weeds on cultivated ground:—*Delphinium ajacis*, *Camelina sativa*, *Caucalis latifolia*, *Coriandrum sativum*, *Amaranthus retroflexus*, *Echinochloa crus-galli*.

Brig. Venning has transferred *Pyrola minor* from an eradicated (building) locality to a new site in the New Forest.

We are grateful to Miss E. R. Banham for organizing the programme of Field Meetings and to all leaders and lecturers for their esteemed help.

A new and valuable asset of the Section is the Botany Room where there is now a permanent botanical exhibition designed and maintained by Miss L. M. Child. Specimens and explanatory drawings contributed by members are displayed. Fresh specimens, models and drawings of Fungi, Lichens, Seaweeds, Mosses and Liverworts in their seasons give instruction on non-flowering plants which members are invited to contribute for identification and display. A list has also been compiled of the Herbarium specimens which are all available to members for identification purposes.

Grateful appreciation is due to Miss Child for her splendid contribution to the Section and the Society.

E. CHAMBERS.

Entomology

In some years certain species of *Lepidoptera* are more in evidence than in others. This applies to immigrants as well as those which are indigenous to this country.

The Silver Y moth (*Plusia Gamma*) has been more plentiful than usual this summer, so much so, that some naturalists have questioned whether it is really an immigrant. Strange as it may seem it often comes over from the Continent in the company of the Painted Lady (*Vanessa Cardui*).

Last year I received a number of 'phone messages reporting the capture of larvæ of the Privet Hawk Moth (*Sphinx Ligustri*), but this year I have had an equally large number of records of the Lime Hawk (*Mimas Tiliae*) and the former has seldom been mentioned.

I am able to report that about three-quarters of the Society's collection of British *Lepidoptera* has been re-named with up-to-date titles in both English and Latin and I hope to complete this work next year.

W. S. I. COX.

Geography

The lectures for this Section numbered fifteen. Ten were given jointly with Photographical Section and three were held conjointly with the Geological Section. Field Meetings numbered seven; one of these was held in co-operation with Dr. Wray and his Section. Mr. Woodhouse and Mr. Bailey kindly helped in leading two of the longer excursions. The September excursion covered villages in North West Dorset never before visited by the Society. The excursion to Bignor was very well attended. It is hoped to re-visit West Sussex in 1954. Professor Cameron's lecture on "Athens" in January was greatly enjoyed. The hall was full.

H. DE CASTRO.

Microscopy

Owing to shortage of lecturers this has been a quiet winter for the Section. The Chairman delivered two lectures on "Some microscopical aspects of insect physiology."

J. H. MURGATROYD.

Photography

As in recent years this Section again joined with the Geography Section in presenting two lectures per month throughout the winter season. Outside help came from Miss A. E. Wilmott, who lectured on Spain and who has since joined our Society; from Mr. Anthony Averell, A.R.I.B.A., whose lecture on Blandford has added to our knowledge of this town which we

visit so often, and from Kodak Ltd., who provided a memorable afternoon of nature films in colour.

It is with special pleasure we welcome members who, for the first time lectured to us. These were Mr. R. R. Walls, M.A., F.R.G.S., Mr. S. J. White and Group Captain E. M. Cashmore. We hope others will follow their example and offer further lectures.

The Misses Penrose have presented to the Society a large and choice collection of early colour photographs made by Dr. Penrose together with the elaborate lantern made specially for their projection. One meeting was devoted to a show of these slides to which the donors provided a most interesting commentary. The showing was repeated to the Bournemouth Camera Club in the evening.

Snapshot Album and Excursion Memories were again repeated and, it is hoped, will become annual events.

At the Leisure and Pleasure Exhibition in the Town Hall in September, 1952, the Section provided two lectures on Bournemouth and its Countryside.

So many of the Society's lectures are illustrated by episcopes or lantern slides that their efficient projection is an important matter. A Panel of Projectionists was therefore formed and after demonstration of the various instruments we use have added to our efficiency and enjoyment. To this panel our thanks are given. The new voice amplifying equipment has also been under their control and has been greatly appreciated.

We would like to record our thanks to the Bournemouth Camera Club for the use of their Lantern Slide Display Cabinet in which we have been able to show from time to time most of the Penrose collection already referred to.

A. W. LEGAT.

Physics and Chemistry

The emphasis of the Section's activities this year has been on Chemistry and chemical industry. Early in the session Mr. Frederic Brooks exhibited and described his unique and extremely valuable collection of chemical elements, and these were again kindly lent by him for show on the Section's stand at the Jubilee Exhibition. The rare and unusual elements known to almost all students merely as names in text books were here seen, admirably arranged in groups and series according to the Periodic System of classification; an introductory lecture was given in November by the writer for the benefit of non-chemist members. This was followed by two lectures on the occurrence and industrial applications of important minerals, and by two visits to the Poole Pottery of Messrs. Carter, Stabler and Adams, the second being necessary on account of the great demand for admission at

the first visit, which exceeded the limit of numbers set by our hosts for visiting parties.

In the direction of chemistry as applied to the biological sciences, the writer lectured on Photosynthesis, and Mr. F. Coleman, M.C., M.R.C.S., on the History of Inhalation Anæsthesia, in the development of which he and his distinguished father had made important contributions.

A successful symposium on Food and Nutrition was held in March, consisting of three short papers read by Miss D. M. Lowther, B.Sc., Mr. F. Coleman and Mr. W. R. Hunt, M.P.S. This certainly lent encouragement to the suggestion to use a similar symposium on some future occasion.

H. E. CLARKE.

Zoology

This Section spent most of its activities out-of-doors during 1952-3, either alone, or in conjunction with the Botanical Section. In the first category four field-days were held, while combined meetings numbered seventeen. Nine lectures were also held during the winter months, while several of the field-days were held for the observation of winter migrant birds during the same period—an innovation which seemed much appreciated.

Last year the necessity was stressed for members to come forward with records obtained throughout the year. Unfortunately these have not been forthcoming to any extent, consequently the sum of such records remains regrettably low.

Miss Christine Popham, M.B.O.U. has been obliged to resign as official keeper of ornithological records and we thank her for past services. We are, however, happy to announce that Miss K. Gorringe has kindly consented to take her place, and so, in future, all bird notes should be forwarded to her. Keepers of records in other branches of zoology are still, however, urgently required.

RECORDS FOR 1952-3.

Aves.

REPORT BY MISS K. GORRINGE.

In addition to commoner species the following were noted:—1953.

- Jan. 5. Pair of Great Crested Grebes (*Podiceps cristatus*).
- „ 6. Hooded Crow (*Corvus cornix*), Bar-tailed Godwit (*Limosa lapponica*). Tree Creeper (*Certhia familiaris*), (2) on pine trees; all Poole Harbour from Shore Road.
- „ 12. Nuthatch (*Sitta europaea*) Pamphill-Cowgrove-Wimborne, Dorset.
- Brambling (*Fringilla monti fringilla*) (6) near Merley.
- Great Crested Grebe (swimming); Black-necked Grebe (*Podiceps cascius*) Sandbanks. (K.G.).

- Jan. 22. Hooded Crow mobbed by Carrion Crows (2) at Evening Hill; several Bar-tailed Godwits, Dunlin (*Erolia alpina*) flocking. (K.G.).
- „ 30. Grey Plover (*Charadrius squatarola*).
- Feb. 6. Blackbird (*Turdus merula*) in song. Alum Chine.
- „ 7. Red-throated Diver (*Colymbus stellatus*). (M.B.).
- „ 18. Marsh Harrier (*Circus aeruginosus*), female (2) Brands Bay area; Black-tailed Godwit (*Limosa limosa*), a flock; Knot (*Calidris canutus*). (K.G. and G.B.).
- „ 19. Black-throated Diver (*Colymbus arcticus*). (M.B.).
- „ 21. White-fronted Geese (*Anser albifrons*), Avon, near Ibsley. Later several hundred. (V. de B.S.).
- „ 26. Black-throated Diver, Hamworthy. (G.B.).
- Mar. 2. Snipe (*Capello gallinago*) (10). Little owls (*Athene noctua*) Avon. (K.G.).
- „ 3. Teal, Tufted, Mallard, Wigeon and Shoveller ducks, all seen at Radipole, very tame, especially Tufted which fed as if domesticated. Avocets reported present upon excellent authority, but invisible owing to fog. (V. du B.S.).
- „ 4. Chiff-Chaff (*Phylloscopus collybita*), singing. Wareham. (W.S.B.). Hooded Crow, Turnstone (*Arenaria interpres*) (6) Shore Road, Poole Harbour. (K.G. and G.B.).
- „ 12. Pink-footed Geese (*Anser brachyrhynchus*), Pintail (*Anser acuta*) (7) Harbridge. (E.B., H.B., V.S.).
- „ 14. Water Rail (*Rallus aquaticus*), Harbridge. (K.G.).
- „ 16. Geese at Harbridge and Avon reported gone. (K.G. and M.P.).
- „ 18. Merganser (*Mergus serrator*) (4) Poole Harbour. (K.G. and G.B.).
- „ 22. Buzzard (*Buteo buteo*) (2) Pentridge, Dorset. (K.G.).
- NOTE.—This species is certainly on the increase.
- Apl. 6. Marsh Harrier. Swineham Marshes. (K.G.).
- „ 7. Cuckoo (*Cuculus canorus*), Holdenhurst. Sandmartin (*Riparia riparia*). Near Bridport. (J.C.).
- „ 8. House Martin (*Delichon urbica*), Morecombe Lake, Dorset. (J.C.).
- „ 17. Grasshopper Warbler (*Locustella naevia*), (2) Christchurch. (J.C.).
- „ 22. Marsh Titmouse (Chickadee) (*Parus palustris*), Rempstone, Dorset. (K.G.).
- May 12. Cirl Bunting (*Emberiza cirlus*) (2). (M.B.).
- „ 16. Sanderling (*Crocethia alba*) (4) Shell Bay. (K.G.).
- „ 17. Shellduck (*Tadorna tadorna*) Juvenile. (8) reported from Stanpit, Christchurch. also Whimbrel (*Numenius plideopus*) repeated seen during April and May. (J.C.).

June 15. Greater Spotted Woodpecker (*Dendrocopus major*) observed feeding young in garden, Branksome Dene. (K.G.).

July 5. Crossbills (*Loxia curvirostra*) (6). (C.P.).

Aug. 26 & 27. A report has been received from Mrs. H. Arnett (non-member) of Bournemouth, that a bird, seemingly an Osprey (*Pandion haliaëtus*) was seen fishing in Poole Harbour. The description, added to the fact that the bird seized a fish in its talons, seems to leave little doubt as to identity. *Pandion* was noted by this Section on the Avon last year.

1952. REPORT BY MISS PENROSE, B.Sc.

Dec. 24. A Harrier, male, probably Marsh, was observed on Shobley Bog, New Forest.

1953.

Jan. An unusual amount of bird-song noted.

Mar. 31. Swallows (*Hirundo rustica*) (2) seen at Picket Post. (M.A.A.P.). Also recorded by another observer at Burton, Christchurch, on 28th. (V.S.).

Apr. 27. Swift (*Apus apus*) near Sopley. (F.E.P.).

Miscellaneous.

1939.

May. A much belated record of a Black-winged Stilt (*Himantopus himantopus*) at Stanpit, Christchurch Harbour is now included owing to the exceptional rarity of this species. (V.S.).

1952.

Oct. 20. Black-tailed Godwits seen at Shell Bay and neighbourhood (6). Also Dartford Warbler (*Sylvia undata*) and Great Crested Grebe, Probability. Confirmed by other observers. (D.M.).

Nov. 6. A Buzzard is reported as having killed a Nightjar (*Capriulgus europeans*) at Bloxworth. Mrs. Belcher records that this is the latest date on which either she or her husband have noted the latter. (E. and M.B.).

„ 13. The Great Grey Shrike (*Lanius excubitor*) is belatedly reported for Bratley Wood. (M.A.A.P. F.E.P.).

1953.

Jan. 30. A Hawk, believed to a Peregrine (*Falco peregrinus*) was seen carrying a large black and white sea-bird (Razorbill or Guillemot) in its talons, flying towards Brownsea Island. (V.S.).

Mar. 23/4. A Shrike on electric wires near the Crowe, Burley Road. (M.A.A.P. F.E.P.).

Two pairs of Dartford Warblers are known to have nested in the neighbourhood of Picket Post, no other details. (M.A.A.P.).

Lapwing (*Vanellus vanellus*) reported to becoming scarce around Ringwood.

Gulls are on the increase.

Buzzards are reported as nesting at Minstead, New Forest. Further particulars are lacking.

CODE FOR INITIALS.

K.G. = Miss K. Gorringe.	D.M. = Miss Marshall.
C.P. = Miss C. Popham.	M.Br. = Miss Brummell.
M.A.A.P. = Miss Penrose,	E. & M.B. = Mr. & Mrs. Belcher.
B.Sc.	J.C. = James Crawshaw.
F.E.P. = Miss F. Penrose.	W.S.B. = Wm. S. Brown, B.Sc.
G.B. = Miss Busby.	V.S. = V. du Bédât Smythe.
M.B. = Mrs. John Beale.	

K. GORRINGE.

V. DU BÉDAT SMYTHE.

The Society's Jubilee Celebrations

The 50-year Jubilee of the B.N.S.S. was celebrated throughout the week April 27th to May 2nd, 1953. The first three days were devoted to a very instructive and interesting exhibition of sectional activities. The opening ceremony, under the President, F. Williamson, F.R.Hist.S., was performed by the Mayor of Bournemouth, Alderman H. A. Benwell, M.C., who expressed his interest in this educational side of life in Bournemouth and his thanks for the public nature of the exhibition. W. G. Smith, H. de Castro and other helpers had given much appreciated services in erecting the stands, and the staged exhibits gave a unique opportunity for visitors to study the Natural Sciences.

Archaeology and History specialised in a display of interesting examples from the Egyptian antiquities in the Society's collection which includes many objects purchased from the late Lord Grenfell's collection. The display included ushabti figures, bronze figures of gods, beads, amulets and many other objects of household and personal use. Many fine photographs of Egyptian sculpture in the British Museum and some fine coloured lithographs of mural paintings published in 1820 were exhibited.

Astronomy and Geography combined and were indebted to Messrs. Phillips' for loan of maps, books and models. The celestial Mercator Chart of first magnitude stars, air navigation charts and the celestial photographs were of general interest.

The Botany exhibit showed by means of drawings and fresh specimens the course of evolution from unicellular Algae and Yeasts through higher *Algae*, Liverworts and *Pteridophyta* to the Phanerogams.

The Entomology and Zoology joint exhibit included Stoat, Weasel, Yellow-necked Fieldmouse and other stuffed mammals and many birds, including the Passenger Pigeon (*Ectopistes migratorius*) now extinct. The three British snakes were on view to show comparisons. Special attractions were locally captured *Rhopalocera*, the Atlas (*Attacus attalus*) in comparison with the Death's Head, Chinese and Japanese *Cicadas*, Locusts, etc., and *Ornithoptera* from Malaya. At the Microscopy Section stand all the Society's microscopes were in use and a series of microscope slides, including popular objects and a set of representative species of British mites, excited considerable interest especially amongst the younger visitors.

The Geology Section showed maps and diagrams illustrative of local geology, particularly of the rocks exposed in the Bournemouth area and the associated leaf beds, some typical fossils from Durlston and Kimmeridge Cliffs and Bays, and of the Selborne area.

No special stand was devoted to the Photography Section but use was made of photographs and lantern slides in displays of other Sections.

At the Physics and Chemistry stand, demonstrations of optical apparatus (some of historic interest) and special equipment for the discharge of electricity through gases, were made possible through the kindness of the Physics Dept. of Southampton University and Mr. M. Child of the London Telegraph Training College. Mr. F. Brooks loaned his unique collection of chemical elements and Branksome Ceramics provided a display of raw materials and partly manufactured pottery.

Lecturettes by the Section Chairmen were arranged for each day and, as usual, parties of local school pupils were received.

On Thursday, April 30th, a visit to Selborne was arranged by members in conjunction with the Rev. W. S. Scott, who very kindly undertook to act as guide. In the absence of Mr. Mayo, unfortunately indisposed, the party was led by the President, Mr. F. Williamson, who reports:—

“Selborne was reached by 12.30 p.m. where the party was met by the Rev. W. S. Scott. Unfortunately, heavy rain had fallen all the morning and it continued all day until the party was nearly back at Bournemouth which was reached at 8.15 p.m. In the circumstances Mr. Scott's guidance was invaluable, first taking us into the Church, where he pointed out all the most interesting features, and then to the Wake, which was Gilbert White's home for many years and is now the residence of Mrs. Bibby, by whose kind permission we were allowed to inspect the garden and grounds. Then a few hardy spirits accompanied Mr. Scott through the woods past Dorton to the site of the Selborne Priory, very little of which remains.

During the visit to the Church, opportunity was taken to measure the ancient Yew tree in the churchyard, and it was found to have a girth at approximately 5 feet of no less than 26 feet 8 inches. Tea was taken at the Queen's Hotel, and after tea Mr. Scott gave a talk on the general history of Selborne and received the grateful thanks of all present.

The weather throughout was so wet that it was found impossible to climb the Hanger, to the disappointment of many. In spite of weather everyone seemed to find the excursion very enjoyable and instructive.”

On Friday, May 1st, at the Winter Gardens, a large audience representative of residents and scholars of Bournemouth and vicinity heard our Jubilee address on “Evolution and Human Destiny,” by Dr. Julian Huxley, M.A., D.Sc., F.R.S. Mr. H. E. Clarke contributes the following precis of the lecture:—

“After an account, on familiar lines, of the course of organic evolution, Dr. Huxley took up the more debatable aspect of man as a creative, self-conscious agent influencing future evolution. In becoming aware of his own personality man had also become aware of the entire evolutionary process on the earth. Modern science provided a picture of the universe as a single process of self-transformation. During the whole of cosmic time there had

been a progressive creation of new actualities. William James introduced the term "world-stuff," which meant not merely matter but matter with the potentialities of mind. There was no sharp line to be drawn between human mind and animal behaviour and it followed that minds have evolved just as surely as material bodies. Self-creation of novelty was the basic wonder of the universe, but, said Dr. Huxley, this eliciting of mind from the world-stuff and its evolutionary intensification, was the basic wonder of life.

There had been an enormous rise in the level of organization, in the intensity and complexity of mental processes, such as knowing and feeling, learning and remembering (just compare a dog or a monkey with a sea-anemone or a snail). It was therefore proper to use terms like "higher" and "lower" to describe types of organisms, and "progress" for certain types of evolutionary trend. A higher organism was one which had realised more of the inherent possibilities of living substance; and biological progress was shown in trends which assisted in the realisation of those possibilities.

The only evolutionary avenue left open to man was through the improvement of his mind and brain. The rise of man along this line had been spectacularly rapid, yet vast possibilities still lay before him. He was the only living type capable of any major advance, the main agency for the further evolution of the earth and its inhabitants. The past, said Dr. Huxley, affords some guidance for the best future policy of creative man. He should aim to control his environment, regulating and living independently of outer change, by increasing his awareness and storing his experiences. In particular, he should exploit to the full his powers of imagination and conceptual thought and his unique capacities for accumulating, organizing and applying his experience, through a culture he can pass on to succeeding generations."

The Jubilee celebrations ended on a lighter social note (and in brilliant sunshine) on Saturday, May 2nd, with a well attended Garden Party and Entertainment for members and friends. Games, competitions, Miss Ogle's show of the wonderful training of her canine friends, and tea outdoors, were all enjoyed. Original plays, some with topical allusions, kindly produced by Mrs. Simmons's party and by our members, together with monologues and competitions, concluded the activities of the day and of Jubilee Week.

A feature of the Jubilee was the production and distribution of a souvenir history of the activities of the Society and its various sections from 1903 to 1953.

To all who worked in any way to ensure the success of the Jubilee and to demonstrate the standard and virility of our Society on its 50th Birthday, sincere thanks are extended.

Presidential Address

Along the Frontiers of Physical Science

BY HERBERT E. CLARKE, M.A., B.Sc., F.R.I.C.

(Delivered before the Society on Nov. 7th, 1953.)

"What is Truth?" said jesting Pilate, and would not stay for an answer . . . yet truth . . . is the sovereign good of human nature.

Francis Bacon : Essay on Truth.

Inductive Approach to Truth.

I am beginning with a fragment from one of the best known and most suggestive essays in our language. Many before Bacon had engaged in chemical experiments either out of curiosity, or in a hunt for the illusory "Philosopher's Stone." But it is to his special and enduring fame that he clearly taught the essential value of the experimental (or inductive) method for the *attainment of truth itself*. He thus helped to enrich the common man's interest and curiosity over natural phenomena with moral values, especially the virtues of integrity, accuracy and self-effacement; to-day these moral principles are looked for in every scientist's work and attitude to life, a fact often overlooked by critics of science as an educational discipline.

Bacon's advocacy of experimentation was a challenge to philosophic pessimists of his own (and later) times when they argued that because our five senses are partial and often unreliable it is vain to use them at all in a search for truth. Careful and painstaking experiment, he argued, could furnish such powerful support to the intellect that it could go on to form sound inferences. And, said he, those inferences, drawn as they might be, from diverse sources and directions, would reinforce and confirm one another in proportion to their trustworthiness. What, he urged, is the use of elaborate logic which can only lead, even by perfect reasoning, to utterly false conclusions if the premises are false? And in his great work the *Novum Organum* he emphasized the importance of instruments and apparatus for the strengthening and enlargement of the senses. In the form of Aphorisms of outstanding insight and originality he set the course which half a century later the first Fellows of the Royal Society adopted for the extension of natural knowledge; modern Science accepts the same guide. The teachings of Francis Bacon may thus be said to have traced a new frontier to knowledge and the assessment of truth, the frontier, in fact, between truth and superstition. Not that the material and

technical achievements of the ancient and mediaeval world are to be dismissed as unimportant, but in general this kind of knowledge was treated as an end in itself and not as a manifestation of great underlying natural laws, awaiting discovery and exploitation by experimental research. The scholastics of the 14th and 15th centuries had concentrated rather on non-material theological, ethical and philosophical topics which (in accordance with their tradition) they handled in ingenious intellectual and logical exercises. They often started from false and superstitious assumptions, and of necessity ended up with completely false ideas about man and the universe.

Non-Experimental Truth.

Everybody to-day acknowledges this weakness of mediaeval scholarship, but we should nevertheless remember that the legal and moral codes of the entire world, (not to mention the still more sublime wisdom of saints, philosophers, teachers and statesmen,) was founded on truth which had no experimental support. In all ages it has been apparent that there is a body of truth, not revealed by the senses or by daily experience, but by intuition and insight, which is just as worthy of acceptance as that inductively won from nature by the experimental method.

Again, long before the establishment of the "scientific method" it was fully realised that the intellect could be kept away from worthless speculations by taking advantage of mathematical, and especially geometrical, aids: these greatly extended the known and accepted factors of a proposition and brought new knowledge. But how wonderfully mathematical manipulation could predict and illuminate physical systems, which could not otherwise be reached by the imagination, was never realised until late in the 19th century; indeed only in recent years could the nature and destiny of the material universe be speculated upon, because our wizards have now elucidated them in abstract mathematical analyses. Experimental checks lag behind, if ever they can be applied, and it is not surprising that many practical men of science have the uneasy feeling that concealed somewhere in these mathematical treatments there may be assumptions that are gratuitous and even specious, and they urge that one's sense of reality is apt to be lost in these mazes of transcendental equations. Few scientific workers have the training and the temperament for such abstract studies, and conventional science in all its branches continues to be enlarged on the Baconian principle of experiment aided by instruments. For something like three hundred years students of nature have gone on devising and improving aids to the senses, so that better and more extended sensory experiences could be gathered from practical tests and trials.

Experimental Limitations.

This concentration of ingenuity and skill upon ever better and

more sensitive apparatus stems from the admitted unreliability and limitations of our unaided senses. We know that we cannot see, hear or feel stimuli which many species of animals normally respond to. And we know that apparatus, however ingenious, cannot relieve us of many other limitations and unreliabilities of which Bacon was completely unaware. He did not realise that every piece of apparatus is itself made of material which can only respond in part to the stimuli it is put up to record. The best the investigator can do is to design his apparatus and instruments as channels for the reception of one stream of phenomena at a time. He must use great care and ingenuity that that one stream is not polluted by what he styles "sources of error," but which in fact are only other facets of the more comprehensive truth, facets with which for the moment he is not concerned. Scientific research has been justified and rewarded by the enormously significant discovery that these several faint impacts we can produce on our senses all lead to a harmonious interpretation by the trained intellect; nay more, they can be used by the imagination to design and predict the outcome of new experiments which in their turn yield the anticipated results. The researcher is so encouraged to hope that he has faint glimmerings of reality: at least he is confirmed in his belief that there *is* something real outside himself, something he is qualified to find out by searching systematically.

Space-Time.

We have now to approach the wide frontiers which physical science presents to the future, and here again we are confronted with the same problem of the interpretation of our sensory impressions. We are by nature conscious of existence in a world of three dimensions, i.e., everything is (1) up or down, (2) left or right, or (3) behind or before us, and we have no difficulty in thinking of any degree of extension in one of these three dimensions unimpeded by the other two. It seems to us that Space is an infinite entity quite distinct from that other infinite entity Time. A flash of the imagination can plant us in an instant in Bourne-mouth Square, or on the surface of the moon, or within some nebula a million light years away. But in such pictures we have no sensory contacts and we soon realise that physical connection with other objects and places involves us in a fourth dimension, that of Time. Every "event" in the Universe is conditioned by this dimension. Try, for example, to consider how two events, one happening on earth and one on (say) the Nebula in Andromeda, can be regarded as occurring simultaneously, and you will find yourself up against a highly complex problem involving time. Remember also that every star has a movement in both space and time which is relative to every other star and that the light it emits into space takes time as well.

Now all published geometry, from Euclid onward, considered space as unlimited and time as flowing independently of it and uninfluenced by it. It was on such a basis that Newton built the magnificent system described in his *Principia* and from his time to our own generation the world of Science and the world of Religion have been at one in supposing that the Newtonian "Laws of Motion" and the "Principle of Gravitation" bore the stamp of a divine order and a universal unchangeability. Matter was conceived as moving through space and time without influencing either and uninfluenced by either. Force and energy were in some way wholly different from matter itself and they merely imposed changes in the direction and velocity of movement of material particles. Newton's suppositious force of gravity operated *through empty space* between all the material parts of the universe, while a medium or Ether had to be invented to account for the "attraction of gravity" as well as for the transmission of light and the other forms of radiant energy. Here let us acknowledge that for two hundred years, while the work of astronomers and physicists was confined to regions of space accessible to their telescopes and to speeds well below that of light, a very close agreement could be claimed between Newtonian mechanics and experimental measurements; mass appeared indestructible and unchangeable, measuring rods reliable in all systems, and time invariable wherever clocks were read. But, at last, scientists reached out to distances infinitely greater and smaller than ever envisaged by Newton, and to velocities of particles not much below that of light itself. They found that neither space nor time is really unaffected by matter moving through it, and that matter (or mass) is changed by every change in its relative speed. Light and other forms of electromagnetic energy travel throughout the universe with an unchanging velocity of 186,000 miles per second, but this can only be possible because the units of measuring rods automatically become smaller when they are set in motion, and because clocks then record time more slowly; yet no observer within such a moving system could be aware of the changes, notwithstanding that they would be easily detected by an observer studying them from outside. In this space-time continuum of four dimensions the relation of events is not that to be expected from the geometry of Euclid, because time now enters essentially into the measured "intervals." A fact of great importance is that many phenomena which the physics of Newton would assign to special "natural laws" are found to be logical consequences of a four-dimensional geometry, which the facts of the case compel us to accept as more appropriate (because more general) than Euclid's for the study of the universe. We must, in fact, adopt new interpretations of space and gravitation, which though unfamiliar and therefore at first approach fantastic to us in this seemingly three-dimensional world, clear the atmosphere of Science of many fond figments of imagination and bring us a

little nearer to the truth as it is. Einstein in an extension of the general theory of Relativity has taught us that the presence of matter modifies the geometry of space-time, and on this basis so-called gravitational attractions* are to be explained. In other words, we reach the astonishing conclusion that space has not one but many systems of geometry, depending upon the mass of the matter affecting it. Space is geometrically different near the sun from space near the earth, and upon this difference the greater so-called "force of gravitation" at the sun really depends.

Experimental Shortcomings in Newton's System.

Now these teachings are as revolutionary as anything announced in Science since Newton and perhaps since Copernicus. They are now some forty years old and it may seem extraordinary that even their fundamental implications are un-realised by many students of physics and completely ignored by most. The vast jig-saw of fundamental truth continues to accept newly found pieces, which seem to fit into their places without pressure from the new space-time corrections to which they are really subject. Newtonian mechanics, for the purposes of experimental science, stands almost unscathed. Indeed I know of only three *experimental*** observations which cannot be satisfactorily explained in terms of the classical geometry of Euclid and Newton's original assumptions of the absolute nature of space and time. It will not be inappropriate therefore to refer, in the briefest outline, to these individually.

In view of the much greater mass of the sun, time according to Einstein's theory ought to run more slowly there than on the earth. Let us consider a definite element (say calcium) present in both the sun and the earth; then the vibrations within the calcium atom which give rise to the light we know to be emitted by that element (and no other) in the sun, ought to be slower, i.e., more red, than those emitted by calcium atoms on the earth, where time goes faster. This anticipation has been confirmed quantitatively: in other words there is an extremely accurate agreement between Einstein's prediction of the amount of the difference to be expected and that found spectroscopically.

A second instance has to do with the revolution of Mercury around the sun, which (as was known to Leverrier of Neptune fame and others) is not the simple ellipse in an unchanging orbit required by his law of gravitation; the perihelion of Mercury,

* In very recent years Einstein in his "Unified Field Theory" suggested the essential identity of gravitation with electro-magnetic energy. The logical outcome of this would seem to be that matter, energy and gravitation are all geometrical variations in space-time, and matter becomes both a cause and an effect!

** I am not here concerned with mathematical developments such as that which has furnished theoretical data regarding the nature and motions of the electrons.

i.e., its position when nearest to the sun, also rotates. It requires Einstein's principle of the modification in geometry undergone by space-time in the vicinity of matter to explain this, and it does so by a perfect agreement with the quantitative requirements of the observations on Mercury's orbit.

This leads to my third example, which concerns the deflection of light which is observed when it passes through a "gravitational field." Now since energy and mass in the newer physics are understood to be only two expressions of the same thing, light like any other mass ought, even on Newtonian theory, to be subject to gravitation. But the bending of the light of those stars which can be seen in the line of sight of the sun during a solar eclipse is twice as great as would be expected from Newtonian geometry; it is, however, exactly the amount of deflection required by addition of the Einstein correction. We can only conclude that although we cannot form a mental picture of a four-dimensional universe there can be no question we live in one of that, or greater, complexity. Three dimensional geometry as taught by Euclid is only one of an indefinite number of geometries, any one of which may frame a system consistent within itself. Speculations on these lines lie along the frontiers of present-day and future physics and cosmology.

Natural Laws and Geometry.

High tribute must be paid to Einstein's successors for their demonstration that if, as suggested by Einstein, the geometry of space-time varies throughout the universe, this can be used to explain, *on the basis of geometry*, not gravitation only, but other so-called "laws of nature" as well. But it must be emphasized that these are not experimental considerations, they are the exercises of the professional mathematicians, some of whom pay no regard for material reality. I think few ordinary people can endorse this type of speculation, for if we believe in our own very existence we cannot help but believe also in the reality of matter, at least as it appears *in the bulk* to our senses.

"Emergence."

Consider for a moment a thread of nylon, or a grain of salt, which one may hold between one's fingers. These two small pieces of matter appear to differ completely from one another, and one is curious to know how those differences in "properties" arise. We may learn from the chemist that the atoms in a nylon molecule are arranged in long chains, whereas in the cubical salt crystal they are tied together in a cubical lattice. Perhaps we here detect the origin of outward properties, but we only have a recognisable thread or crystal when millions of millions of atoms co-operate to bring us something big enough to be seen and handled. In other words recognisable properties only emerge

when prodigious assemblies of atoms are presented to us; what the "properties" of the atomic units themselves may be, is entirely unknown to us. Newton (and indeed the atomists of much of the 19th century) assumed that atoms were solid and hard because a lump of some substance containing them was solid and hard. In recent years, as we shall presently see, much has been learned experimentally, as well as from abstract reasoning, about the constitution of the atom. It is certainly not solid and hard, but this new knowledge affords little support for the suggestion that the atom is a pure figment and matter a dream; we are simply reminded that *our impressions are almost entirely statistical*. The materialistic and mechanistic notions of the 19th century have gone, to be replaced by alternatives much more difficult to visualise. We can only hope that this will not be seized upon again by philosophers who know little or nothing about physics, or by physicists who have only a fragmentary acquaintance with philosophy, to darken counsel with their so-called popularizations, such as those which had such a vogue in the early decades of this century and spread abroad phantasies which are only even now being laid. Incursions by physicists into the territories of theology and metaphysics were especially deplorable, and it is a good thing that much of the nonsense (in particular that written by Jeans and Eddington,) was exposed* by competent critics within the lifetime of those physicists-turned-philosophers, and is rarely used or quoted to-day.

Subatomic Particles.

I will bring to a close this very fragmentary review of the frontier which present-day physical science presents to the future, with brief references first to the smallest and then to the most vast of its interests. While nuclear physicists are probing the interior of the atomic nucleus, the cosmologists, radioastronomers and astrophysicists are reaching out for answers to problems they find in the remote depths of the universe.

Modern notions of the nature of the atom may be said to have originated some sixty years ago, when, as a conclusion drawn from his researches into the conduction of electricity through gases, J. J. Thomson indicated that whatever the element studied, it always displayed the presence within its atom of the same kind of negatively charged particle, which was characterised by an unvarying mass and an unvarying charge—this we now call the "electron." And inasmuch as atoms of chemical elements are normally electrically neutral it was argued that there must be a balancing charge of positive electricity somehow set up against this negative electron. Applying this general consideration to hydrogen, the lightest of all atoms, it soon appeared that the positive constituent, now called the "proton," was also the seat

* See for example the trenchant exposure of their pseudo-philosophy by L. Susan Stebbing, in "Philosophy and the Physicists" (1937).

of most of the mass of the atom, as it was some 1,840 times more massive than the electron; this "nucleus" of the hydrogen atom was unique in consisting of nothing but one proton which electrically balanced one electron. Could it not therefore be that Prout was right after all when he suggested that all elements were assemblages of hydrogen? It was just necessary to elaborate that hypothesis by supposing that they were assemblages of positive protons balanced by negative electrons. Thus Rutherford's researches led to the atom being pictured as a sort of solar system, the massive nucleus being surrounded by planetary electrons, which although of extremely small mass were nevertheless particles, circulating about the nucleus in definite orbits. It was soon shown to be inadmissible to suppose that electrons and protons could be mixed up inside the nucleus—all the electrons must be planetary particles. But here a profound experimental discrepancy arose. If the mass of an atom was, within limits, simply the mass of its protons, then the positive electrical charge on any atom, depending upon the number of protons in the nucleus, must be directly proportional to its mass; which, with the solitary exception of hydrogen, was never the case. This was only one of the difficulties remaining unsolved until the discovery in 1931 of the "neutron," a nuclear particle having the same mass as the proton but none of its positive charge. Matter, said the physicists, thus consists not of two but of three fundamental particles. But the trouble was really only beginning, for if there were no electrons inside the nucleus why did they so often appear when a nucleus was broken? A neutron must somehow change into a proton for an electron to be emitted as a newly created particle. And was not the reverse of this also conceivable, a proton changing into a neutron by emitting a hypothetical particle resembling an electron in everything except in carrying a positive charge instead of a negative one? Quite so, and in due course such a particle, now called a "positron," was definitely detected in the course of researches into cosmic rays. During such a transformation as the change of a neutron into a proton plus electron, the theoretical analysis requires that an uncharged particle, smaller far than the electron and positron, must be transiently formed, and to this has been given the name "neutrino." The positron is almost as short-lived; it is, as it were, an unwelcome visitor to our material world, where only its negative counterpart, the electron, seems to be endowed with a stable existence as an essential constituent of every atom. Wherever a positron and an electron meet they mutually destroy one another as particles of matter, and their equivalent in the form of energy comes into existence. Nevertheless Dirac postulated the eventuality somewhere within the universe of the reverse change occurring, i.e., that energy may, so to speak, "condense"

into material electrons and positrons in equal numbers, mass being in this way created out of energy. But such a source would not account for the origin of the much more massive and complex nucleus of a terrestrial atom.

We note, then, that during the latest quarter of this century we have witnessed an extension of the frontier of physical speculation regarding the internal structure of the atomic nucleus. To just two particles of equal mass, the proton and neutron, we have added the positron and neutrino, only to find that we are even yet only at the beginning of a complex problem. It is still being shown that a large number of other particles intermediate in mass between electron and proton can be formed and have a brief existence. These "mesons" were discovered in the course of researches into cosmic ray showers. They may appear as positively or negatively charged or as uncharged and they include, probably among many others, particles of 210, 276, 800, and something over 1,000 times the mass of the electron. It is not known for certain whether they are not themselves groups of other particles. What certainly emerges from these remarkable discoveries is that we are bound by every scientific consideration to regard these mesons as material particles so long as the electron is treated as a particle of matter. The nucleus of the atom is thus experimentally shown to be a complex system and most laboratory workers accept this fact as good ground for believing that all subatomic nuclear particles, or "nucleons," are particles of matter and not mere phases of space-geometry. We cannot visualise such particles, and a faulty reading of the Heisenberg Principle of Uncertainty (or Indeterminacy) has produced in some minds the impression that they are only figments of the imagination. Let me here say that there are fundamental barriers to the close study of such minute entities. For example it is now realised that any experimental refinement which we apply for obtaining a more accurate measurement of the *speed* of an electron only renders more uncertain and inaccurate our attempt to measure its *position* at the same instant, and vice versa; perfect accuracy both as to velocity and position at a given instant cannot possibly be hoped for when we are dealing with particles no larger than one wave-length of the energy used for the measurement. But just as we cannot reject the four-dimensional character of our universe because we cannot draw a picture of it, so we cannot reject the actuality of the electron because we find it elusive to deal with.

The Universe.

And so, having directed our thoughts for a while to the infinitesimally small, let us now turn them to the combined vastness of space-time. The extra-galactic nebulae, which may be considered the operative units of cosmic change, seem (perhaps, they say, because space is "expanding") to be flying away from

one another at speeds which are the greater the more remote they are. One (diminishing) school of cosmologists would ask us to take this as the sequel to some great explosive creative event which happened a few thousand million years ago. Another school prefers to regard creation as continuous and therefore without a logical beginning or end. Hoyle, a vocal protagonist of creative evolution and infinite space, thinks our three-dimensional outlook sufficient for an intelligent reading of the universe, but only, we find, at the price of accepting the far more difficult hypothesis that new atoms of hydrogen are being created throughout space out of precisely nothing! It is too early in the day to claim that Hoyle has performed an elaborate unconscious *reducio ad absurdum*, but one cannot but feel that the great problems of the Universe will not be solved from three-dimensional premises.

You see, there is no observational check on these conflicting speculations, so it behoves the weaver of hypotheses to beware. We seem to hear the warning note of Francis Bacon's voice sounding through the centuries.

Insect Respiration*

By J. H. MURGATROYD, F.L.S., F.Z.S., F.R.E.S.

The tracheal system of respiration in insects is almost unique. There is a partial system in certain other groups of arthropods, but in no other group is it so complete as in the *Insecta*. Instead of the individual cells of the body being supplied with oxygen, and having their carbon dioxide removed by solution in the blood-stream, each individual cell is supplied with gaseous air and its carbon dioxide removed in gaseous form by a system of fine tubes communicating with the outside air. These fine tubes, called tracheoles, ramify and anastomose throughout the insect body. As they grow further away from their tip they increase in size and fuse together until they reach the larger tubes called tracheae, which eventually run into the main tubes on each side of the body, called tracheal trunks. From these trunks run off short tubes to the spiracles (fig. 1), openings in the integument through which atmospheric air can enter the system and the carbon dioxide leave. These spiracles, situated on the sides of the thoracic and abdominal segments, are provided with valves so that they may be closed at will, and they also carry a thick matting of hairs, the purpose of which is two-fold. First, to prevent dust, water and foreign matter from entering the tracheal system, and secondly to prevent too fast a flow of air in or out, thus lowering the humidity gradient between inside and outside and preventing too rapid loss of water.

It is important to note that the entire tracheal system is of a chitinous nature (similar to that of the integument) and is impermeable to water and practically impermeable to gases. The entire system is an invagination of the integument (which takes place during the embryonic period), with the result that the layers of the integument are reversed, the basal hypodermal layer being on the outside and the epicuticle on the inside (fig. 3). There are ventral commissures across from one tracheal trunk to that on the other side, their purpose being to ensure a supply of air if some of the spiracles on one side are put out of action. So efficient is this provision that most insects can live for quite a long time after all the spiracles on one side have been stopped with wax. To prevent them from collapsing

* A portion of a series of two lectures on "Some microscopical aspects of insect physiology," read January 15th and April 16th, 1953. In the preparation of these lectures the author has drawn freely upon two excellent standard works on the subject—Dr. A. D. Imms' 'General Text Book of Entomology' and Dr. V. B. Wigglesworth's 'Principles of Insect Physiology.'

under pressure the tracheal trunks and tracheae are strengthened by a spiral thickening on the inside of the wall, somewhat similar to that of an ordinary armoured hose-pipe (fig. 3).

Sooner or later each trachea, after numerous simple branchings, reaches a point where it divides simultaneously into several branches, and the junction is embedded in what is known as a 'stellate cell' (fig. 2). This is a large nucleated cell which, owing to the pull of the fine tracheoles passing through its wall, assumes a rough star shape. The purpose of these stellate cells is not understood. All that can be said with certainty is that the spiral reinforcement, characteristic of the trachea, never goes beyond this point. The final tip of each tracheole is embedded in the wall of a cell, but is closed at its end by a fine membrane, so that the final transfer of oxygen and carbon dioxide must be by osmosis. It is not correct to say that there is a tracheole for every cell in the body. Each ending seems to serve a bunch of cells, and some transfer must take place through cell-walls by osmosis.

Years ago there was much speculation as to how far the gaseous air penetrated the tracheoles, i.e., just how near their tip was the air-water line. The older entomologists had solved this problem to their own satisfaction by cutting sections (from dead specimens of course), and examining these. They found that the air-water line was drawn well away from the tip of the tracheole (fig. 4A). However, recent work with live specimens (using insects which are almost transparent) with special lighting has shown that this old conception is quite wrong. In the live insect the air-water line is much closer to the tip of the tracheole, but varies its position according to the activity going on.

The position of the air-water line is determined by the balance of two opposing forces. First, since all the tracheoles are very small (of capillary size of the order of $1\text{--}2\ \mu$) there is a 'capillary pull' which tends to draw the air-water line away from the cells towards the spiracles. It is limited in its area of action since the tracheoles increase in size until they are so big that the capillary pull is lost. We imagine this capillary pull to be a fairly constant quantity. The second force at work, the 'metabolic pull,' represents the hunger of the cells for oxygen, and tends to pull the air-water line towards the tracheole tips and away from the spiracles. The extent of this pull will vary according to the amount of metabolism going on in the cells. In fig. 4B a piece of muscle, with its attendant tracheal system, is shown. The muscle has not been in use for some time and so the cells are requiring very little oxygen. In consequence the capillary pull much exceeds the metabolic pull, and the air-water line is drawn well away from the cells as shown. In

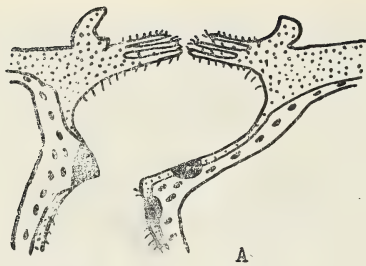
fig. 4C the same muscle is shown immediately after being exercised. The cells are now oxygen-starved, drawing hard, and the metabolic pull exceeds the capillary pull, so that the air-water line is drawn well in towards the cells. This explains why the older researchers, working on dead material, obtained wrong results. In a dead specimen the capillary pull still operates, but the metabolic pull has ceased.

Under normal circumstances the tracheal system is a diffusion system, and no pumps or boosters are employed. In many strong-flying insects, however, the larger tracheae of the thorax open out into large air-sacs, which expand and contract by the action of the wing muscles, thus speeding up air circulation at a time when it is most needed. For a long time the blood circulatory system and the tracheal respiratory system were regarded as two quite distinct and separate systems, each with its own specific function. Recent work has shown, however, that, at any rate so far as the elimination of carbon dioxide from the body is concerned, the blood circulatory system plays a much bigger part than had been thought. Samples of air drawn from the hind-end of the tracheal trunks generally show a higher percentage of carbon dioxide than do samples taken from the fore-end. Insects in 'quiet respiration,' i.e., resting quietly and thus using very little oxygen, do so with only the hind pair of spiracles open, all the others being closed. The inference to be drawn is that the blood-stream picks up a certain amount of carbon dioxide during its journey round the body, and on reaching the hind end of the body, gives up this carbon dioxide through the tracheae.

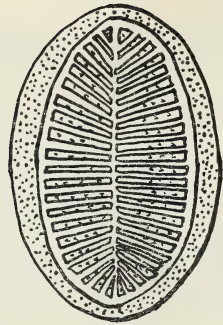
The fully aquatic larvae of many insects have tracheal gills in which the entire branching system, instead of being on the inside of the body, is outside, thus exposing a large area for the absorption of oxygen from the surrounding water. Dense mats of hair at the base of the gills prevent loss of water if the habitat dries out. In adult aquatic insects, such as the great water-beetle and the water-bugs, the insect carries down below the surface an air-bubble from which it can breathe for some time, but in most cases it has to return to the surface at intervals to renew the bubble. A number of insects, however, such as the beetles of the genus *Elmis*, do not appear to come to the surface at all to renew their air supply. Some recent excellent work by Dr. W. H. Thorpe at Cambridge* has shown that an air bubble, or 'plastron,' of sufficient area can renew its oxygen from the surrounding water as fast as the insect consumes it. Such a plastron is secured to the body surface by a mat of very fine bent hairs, amounting in some cases to as many as two to two and a half million per square millimetre.

* See W. H. Thorpe, "Plastron Respiration in Aquatic Insects." *Biological Reviews*, 25 : 344-90. 1950.

The tracheal system of respiration is ideal for arthropods of small size. It is not without significance that probably ninety per cent. of the known insects range in size from roughly 5 to 20 mm. The instant response of the tracheal system to sudden calls enables small insects to exert, for a short time at any rate, a muscular effort out of all proportion to their size. For larger animals, however, difficulties due to the slow rate of diffusion arise, and the world's present known largest insects appear to be approaching the limit at which the tracheal system can be made to work satisfactorily—a fact for which we human beings should be truly thankful, as otherwise we might find ourselves faced with beetles as big as lions and tigers.

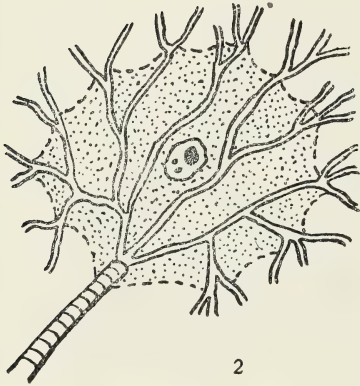


A

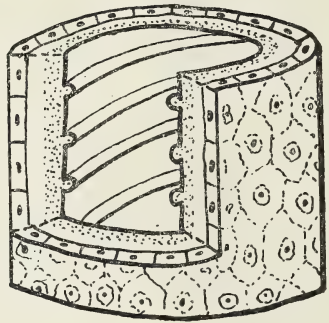


B

1



2



3



A



B



C

4

Fig. 1. Spiracle of lepidopterous larva: A. in section. B. from above. Fig 2. A 'stellate' cell, showing how the spiral thickening of the trachea ceases at this point. Fig. 3. A portion of a trachea, showing how the spiral thickening arises from the epicuticle which is on the *inside*, the hypodermal layer being on the *outside*. Fig. 4. A portion of an insect muscle with its attendant tracheal system: A. Figured from a dead specimen, showing how the air-water line is pulled well away from the cells, B. from a live specimen which has been at rest, showing the air-water line still drawn well away from the cells. C. From a live specimen after activity, showing the air-water line drawn well in towards the cells.

Fig. 1 after A. D. Imms. Figs. 2, 3 and 4 after V. B. Wigglesworth.

Ancient Bronze Implements and Hoards

By J. BERNARD CALKIN, F.S.A.

(In these pages we shall be mainly concerned with a region bounded by Christchurch, Hamworthy, Wimborne and Sopley at its four corners. Finds from other areas mostly within the Stour-Avon watershed are also mentioned, these being distinguished by an asterisk).

The great abundance of prehistoric pottery, arrowheads, axes and other flint implements which have been recovered from the Bournemouth area during the present century point unmistakably to a considerable population in Neolithic times and throughout the Bronze Age [1].§ As however very few of the local barrows contain any traces of 'grave goods,' we may conclude that the natives were not very prosperous. The general poverty of the soil probably prevented both agriculture and stock-raising being practised on anything but a very small scale, whilst the discovery of more than five hundred arrowheads suggests that the inhabitants for the most part were still in the hunting stage.

It is therefore not surprising that none of the earliest types of bronze implements (i.e., flat axes and daggers) has so far been recorded from our area, nor is the total number for the later periods particularly impressive. The chief interest in the series lies in the evidence it affords of wide trade contacts. These serve to remind us of the great significance of the harbour of Hengistbury at this period, in as much as it was the chief port linking the prosperous communities on Salisbury Plain with their contemporaries on the mainland of Europe.

On passing inland from the coastal region, the finds are nearly always close to rivers or streams, and suggest that cross-country routes followed the Stour and its tributaries. On the other hand the Avon valley is almost sterile along the ten mile stretch below Fordingbridge; there is reason to think that this section of the river was specially liable to flooding [1. p. 54].

The local series of bronze axes is fortunately representative enough to show the chief stages in the development of this implement into a really serviceable tool (fig. 1. nos. 1-5). The wooden handles normally used for these axes had a short end-piece at right angles to the shaft as in a walking stick. This piece was cut into two tongues and the axe firmly bound between them. The early flat axes were generally widened at the cutting edge so as to make the most of the metal. In use they were liable to work loose in the haft, so it became customary to hammer over the sides into flanges to help keep the axe in position.

§ For list of references in heavy type see at end.

In the palstave the flanges were cast, and became much larger, forming as it were a pair of sockets for the tongues of the handle. A stop-ridge was added to prevent the handle being split by the butt-end of the axe, whilst a loop for attachment by a thong gave greater security. British palstaves were exported in large numbers, but the socketed axe of the Late Bronze Age fitted with a single socket for the handle, was an innovation introduced from abroad.

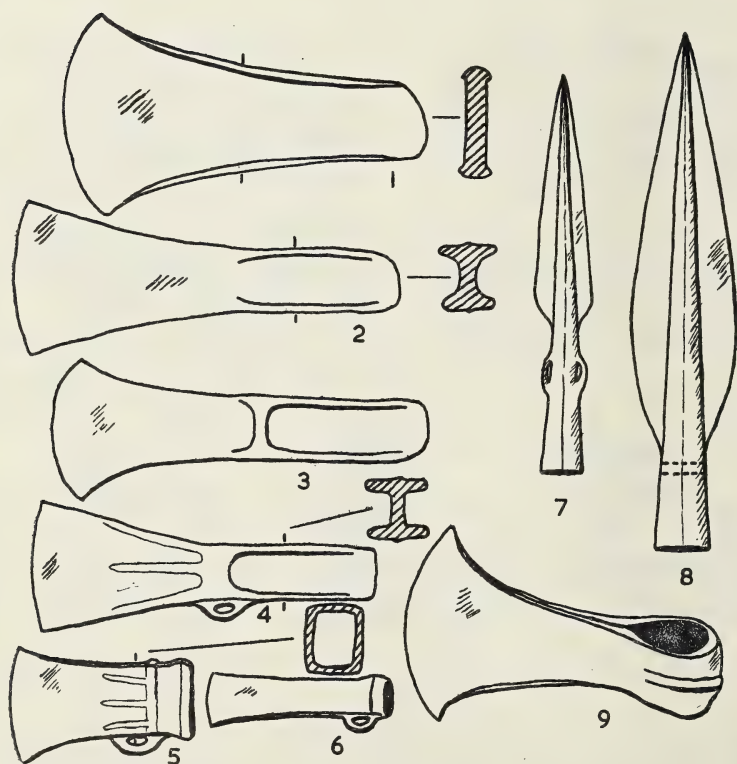


Fig. 1. Local types of bronze implements. Scale $\frac{1}{3}$.

- | | | |
|------------------|------------------|-----------------|
| 1. Hengistbury. | 4. Queen's Park. | 7. Wick. |
| 2. Southbourne. | 5. Christchurch. | 8. Pokesdown. |
| 3. Talbot Woods. | 6. Tuckton. | 9. Southbourne. |

BRONZE IMPLEMENTS.

EARLY BRONZE AGE 1900-1400 B.C.		Date	Museum†	Reference
Flanged axe (fig. 1, no. 1)	Hengistbury Head	1953	R.C.M.	
* " "	Alderholt	1920	A.T.M.H.	
* " "	Sandleheath	c.1896	P.R.F.	
*2 grooved daggers	Boveridge, Cranborne	1886	D.C.M.	
MIDDLE BRONZE AGE 1400-750 B.C.				
Spearhead with side-loops (fig. 1. no. 7)	Barrow plot, Wick	1929	C.C.M.	2
" "	Wimborne	1935	D.C.M.	
* " "	Gussage	c.1946	G.M.L.	
* " "	Tarrant Gunville	1892	B.M.	5 iii. p. 459
* " and armilla	Bryanston	1892		
*Rapier	Shapwick Down	1851	B.M.	
* " "	Tarrant Monkton	1892	B.M.	5 iii. p. 576
Pin	Latch Farm barrow	1937	C.C.M.	3
Accompanying a cremation in an oak tree-trunk coffin, the pin may have served to fasten a cloth round the bones.				
Palstave, no stop-ridge (fig. 1. no. 2)	Belle Vue Rd., Southbourne	1911	C.C.M.	
" "	Pokesdown Hill	1911	R.C.M.	
" "	Irving Road, Southbourne	1910	R.C.M.	
" "	Wimborne	1873	B.M.	
* " "	Frogham, Fording-bridge	1943	A.T.M.H.	
LATE BRONZE AGE 750-400 B.C.		Date	Museum	Reference
Spearhead, pegged (fig. 1. no. 8)	Pokesdown	1927	B.M.	4
Aligned with it in the ground was a hollow pipe 7ft. long and 2ins. in diameter, showing where the shaft had lain.				
*Spearhead, pegged	Middle Gussage	1871	S.M.	
Sword (point only)	Leybourne Av. E.P.	1934	B.M.	
* " leaf-shaped	Woodlands, Gussage	1892	B.M.	
" " V-hilt	Tarrant Monkton	1892	B.M.	5 iii. p. 576
" carp's tongue				
*2 swords, leaf-shaped	Cranborne		B.M.	
*6 torcs and 2 armillae	Tarrant Monkton	1857	B.M.	5 iii. p. 576
Found during the draining of a water meadow.				
Palstave, with stop-ridge (fig. 1. no. 3)	Talbot Woods	1927	B.N.S.S.	
" "	Purewell	1921	C.C.M.	6
" "	Tarrant Gunville		S.M.	
* " "	Alderholt	1938	A.T.M.H.	
* " "	Shappen, Burley	1926	B.M.	7
Found in a rabbit burrow.				
Palstave, looped (fig. 1. no. 4)	Littledown Ave., Queen's Park	1934	R.C.M.	
* " "	Tarrant Monkton	1892	B.M.	5 iii. p. 576
* " "	Pilley, East Boldre, Beaulieu	1943	C.C.M.	

† See key to collections at the end.

* See page 1.

- *14 palstaves looped, Hinton Admiral 1750 8
or socketed axes
Found in "a decayed earthenware pot" with 14 other pieces of bronze. Sold in 1806 with the library of John Meyrick, Esq., at Covent Garden for £1 8s. 0d. Present whereabouts unknown.
- Palstave, double-looped Nr. Five Ways, 1894 9
Charminster Rd.,
Bournemouth
A very rare type in Britain, but abundant in N.W. of Iberian peninsula, its place of origin. Formerly in possession of the 5th Earl of Malmesbury.
- Shaft-hole axe Southbourne 1937 B.M. 10
(fig. 1. no. 9)
Mr. H. C. Audin, while fishing off the shore, hooked up a miscellaneous collection of objects all tangled together: some rope, part of an engineer's overalls, and a mass of seaweed with its roots attached to a bronze axe. The axe which dates from c. 750 B.C. is unlike any British axes. It is a Sicilian type, with a shaft-hole as in a workman's pick, and only one other appears to be known north of the Alps. Possibly, the axe came from a Mediterranean merchantship wrecked off Hengistbury Head, but more likely it was washed out of the cliffs by the sea.
- Socketed axe Christchurch 1912 R.C.M.
(fig. 1. no. 5)
" Hengistbury Hd. B.M. 11 p. 62
" (fig. 1. no. 6) Tuckton 1912 C.C.M.
Brittany type
- Socketed axe or Southbourne c.1922
palstave
Found by a Dr. Brooks in the cliff near Solent Road. This may be the axe bought in 1940 by the Mortimer Museum, Hull, and labelled "From near Bournemouth."
- *Socketed axe Sandleheath 1920 A.T.M.H. 16
Identified by Miss L. F. Chitty, F.S.A., 1920, as coming from a Welsh mould.
- *Socketed axe Ringwood 1881 A.T.M.H.
* " " Rockbourne Down 1817 B.M.
* " " Verwood c.1936 D.C.M.
* " " Tarrant Rushton W.E.W.
Probably Irish.
- * " " Tarrant Monkton 1892 B.M. 5 iii. p. 576
*8 socketed axes and Thorney Down D.C.M.
gouges
- *25 socketed axes or Stoborough, c.1835 5 i. p. 100
palstaves Wareham
Found in a small barrow near Kingbarrow. At least two were socketed axes.
- *4 chisels ? Dunsmoor c.1870
" Between Gaunts and Martel, Robert Hayward found 4 pieces of bronze like chisels, thin at both ends. He placed them beneath a clod, thinking to take them home in the evening, but forgot them, and could never find them again. They were 6ins. long, and 1in. broad." This note was found among papers belonging to Mr. F. Argyle, a Christchurch antiquary.

HOARDS.

The above list includes five instances of groups of implements occurring together. These hoards represent the stock-in-trade of travelling merchants or bronzesmiths. In addition to implements, the Hinton hoard contained a number of ingots, presumably ready for casting as required, whilst 11 of the 12 palstaves from Burley had been made in the same mould. On Thorney Down, Sixpenny Handley, axes and chisels have come to light from time to time; they are thought to be derived from a hoard which has been disturbed and scattered by cultivation. One of the axes may be seen at the Red House Museum, Christchurch. Traders' hoards often contain scrap metal in the form of broken axes and spearheads intended for remelting, but local examples appear to be wanting.

Two other instances of traders' hoards must be mentioned:—About 1930 Messrs. Stokes Bros., Builders, were employed to put up a new row of houses near the corner of Hamworthy Road and Tucker's Lane, opposite the Hamworthy Schools. An old hedge had to be removed, and here 2ft. below the surface five polished flint axes were discovered. One was presented to Poole Museum by the late H. P. Smith, M.B.E. [13. p. 35]. This hoard was deposited about 2000 B.C. The other find was made at Tuckton. In August 1912 a small tin box containing 42 bronze medals was dug up by James Chatten, when laying a surface-water drain at the bottom of Castlemaine Road. The medals are all alike and resemble sovereigns, with the head of Queen Victoria on one face, whilst St. George and the dragon and the inscription "To Hanover, 1838" appears on the other. Shortly after the Queen's accession, the Duke of Cumberland was generally believed to be aspiring to the royal hand. These medals are supposed to satirize his disappointment. This hoard, which may have been the property of some travelling pedlar, was acquired by the late Herbert Druitt and is now in the Red House Museum, Christchurch.

Another class of hoard consists of personal belongings, most commonly in the form of coins. This is generally known as a domestic hoard. In the absence of banks and safes in ancient times, such property was often buried in the ground for safety during times of danger, whilst the owners did not always survive to recover it. When objects of gold or silver have been hidden, and their owner cannot be traced, the law pronounces them as TREASURE TROVE, and they are the property of the Crown. The finder is generally awarded their full market value.

DOMESTIC HOARDS.

		Date	Museum	Reference
Hoard of 677 coins.	Holdenhurst.	1905	C.C.M.	12
The "Southants" hoard was dug up by Mr. George Kilminster and his groom-gardener whilst ferreting, and was acquired by Mr. Herbert Druitt. The hoard which was found in a jar contains about 50 Roman coins and 15 local imitations. The remainder are mainly British, about half being of a type previously unknown. These coins are discussed below.				
Hoard of 3,000 coins	Hengistbury.	1911-12.	B.M.	11
Found during the Society of Antiquaries' excavations, they are similar to those in the Southants hoard, but with several new varieties. Many had been packed in bundles in some kind of fibrous material, and came from the site of a ruined building. Most of the coins are bronze, others are mainly silver or silver-dipped. Some have been cut with a chisel and bent open, exposing the base metal below the surface. Examples from this hoard can be seen at the B.N.S.S., R.C.M. and C.C.M. (see key at end).				
Hoard of 984 Roman coins.	Sterte, Poole.	1930.	P.M.	13 p. 90.
Found in a jar during the laying of a water main. The coins range in date from 250 to 274 A.D. and are made of debased silver. In Roman times Sterte was probably a more or less deserted spot across the water, opposite the busy port of Hamworthy.				
Hoard of 366 Roman coins.	Sterte, Poole.	1835.		13 p. 63.
The fate of this earlier hoard is not known.				
Hoard of about 20 Roman coins.	Pamphill.	c.1736.		5 iii. p. 236
This hoard which included coins of Postumus and Gallienus was found in a pot. It was claimed by John Bankes.				
Hoard of gold ingots.	Hampreston.	1864.	B.M.	
Some farm servants ploughing in a field known as Reeks Moor came across five gold ingots and a gold pellet. The ingots were portions of an armlet, being lin. and upwards in length. They were marked with Roman figures according to their size. The hoard was declared treasure trove, and the farm servants were rewarded.				
Hoard of spade guineas.	Boscombe.	c.1887.		
Many conflicting stories about this discovery were passed round 'sub rosa.' It appears that during the construction of Parkwood Road, one of the workmen unearthed a crock full of gold coins in a gravel pit near the west end of Darracott Road, either on or near the site of the Catholic Convent. According to several authorities the foreman became interested, and sent the finder round to the nearest pub to get a pint. On his return the coins had gone. The foreman is said to have spent a pleasant holiday in France [15]!				
"Spade guinea" was the name given to the second gold coin issue of George III (1787-1799). It was so called because the design on the reverse side showed a shield resembling the shape of a garden spade.				



Fig. 2. British gold bracelet from Hengistbury. Scale $\frac{1}{2}$
(This photograph is reproduced by kind permission of the Society of
Antiquaries.)

- 2 Hoards of Roman - Langton Matravers, 14
 coins, Purbeck. 1817 & 1842. App. p. 281.

Both contained 3rd century coins and may represent the savings of quarry owners. Purbeck marble was widely used for mortars and for building purposes.

- Hoard of coal-money. Eastcreech, Purbeck. 1869. 14
App. p. 282.

Found in a pot on the site of a Roman villa. Coal-money is a misnomer, and refers to waste cores which were produced in the manufacture of shale arm-lets. These cores may sometimes have been collected and used as counters.

- Hoard of 34 Roman Baiter, Poole. 1935. P.M. 13
 coins. p. 91.

The coins are silver, in mint condition and date from the mid 3rd century. Their discovery was reported on the same day that the large hoard of similar coins was found on the site of Marks & Spencer's new store at Dorchester, from which these coins are thought to be derived!

- Hoard of 3 various Swanage. c.1943.
 coins.

Whilst removing earth from the old Durlston Court School's playing-field, a labourer found together a Kruger sovereign, a small Roman coin and a George III half-penny. This strange assortment was doubtless a school-boy's collection, and probably fell out of his pocket!

- Hoard of 6 halfpennies. Throop. 1928. C.C.M.
 William Read, whilst demolishing a dairyhouse, found six George III halfpennies all together in the brick foundations of the wall. Perhaps a relic of the old foundation sacrifice, or as we should say to-day, "buried for luck."

GOLD OBJECTS.

There are two local discoveries of gold objects referable to the Bronze Age. In excavations near St. Catherine's Hill, the 3rd Earl of Malmesbury obtained a gold torc with buffer terminals from one of the barrows at Blackwater. It dates from about 1000 B.C. [9]. An interesting cremation burial of the Wessex culture of the early Bronze Age, about 1500 B.C., was excavated near Double Dykes in 1912. It was found in the barrow which is situated about 150 yds. S.E. of the Hengistbury car park at the end of Broadway. Accompanying the cremation (in an inverted burial urn) there were a pottery 'incense cup,' 3 amber beads, a miniature bronze halberd with an amber handle, and 2 gold cones about $\frac{3}{4}$ in. in diameter. These are no doubt coverings for buttons which would have had a base made of wood or shale [11].

The official Hengistbury excavations in 1911-12 also yielded gold objects of the Romano-British period, a gold bracelet (fig. 2), part of a gold torc and some pieces of gold wire, all being found on the coin site mentioned above. Among the coins

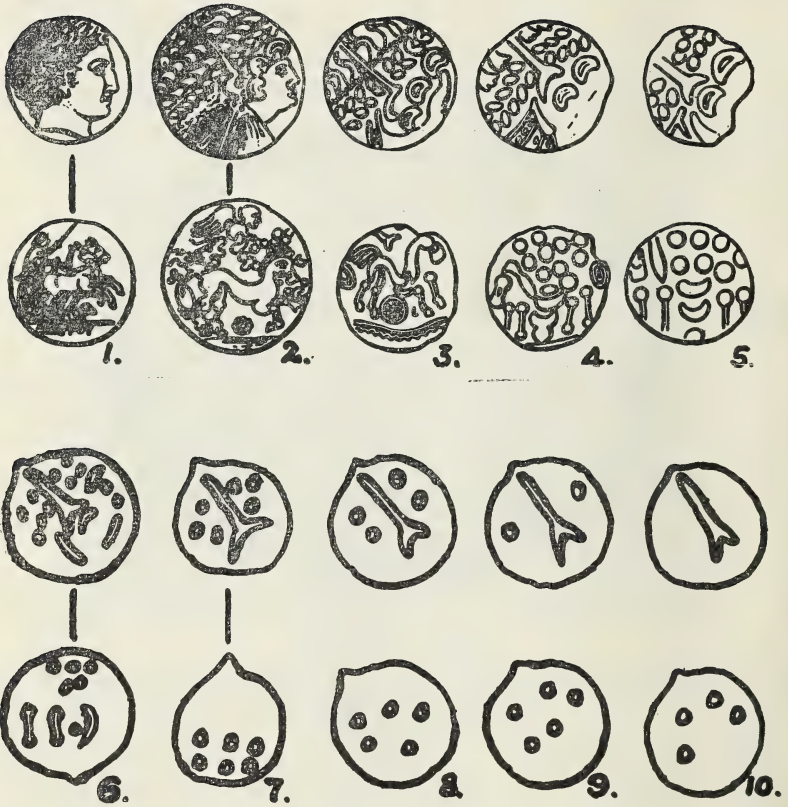


Fig. 3. Coin series showing how the degenerate Hengistbury class of British coins (nos. 6-10) can be traced back to a Greek original. Scale 1/1.

were two British gold staters and ten quarter staters [11]. There are also three others in the British Museum: (1) A British gold stater of the 1st Belgic invasion, imitating the Atrebates. This was found at Hengistbury by Bill Coakes about 1911. (2) A British gold stater of the Eastern group found by Sidney Pester in 1922, at the foot of the cliff near Solent Rd., Southbourne. (3) A quarter stater (? Aulerici Diablintes of Brittany) also found by Sidney Pester at Hengistbury in 1911.

About 1935 a labourer informed me that a gold coin, not identified, had been found 20ft. deep in a gravel pit near the north end of Wimborne Road, Moordown. If really found at this level, it must have fallen into the excavation from the top soil. This discovery probably explains why the hoard of spade guineas has also been attributed to Moordown.

LOCAL BRITISH COINAGE.

The native British coinage of S.W. Britain has a complicated history, the design being ultimately derived from the Greek gold stater of Philip II of Macedon. In later times some of these coins found their way into Gaul, where they were copied by barbarian craftsmen. These coins in turn were also copied, the design deteriorating stage by stage until it became unrecognisable.

The coin series is a most striking example of degeneration. The handsome Greek original is shown in fig. 3. no. 1, which depicts the head of Apollo on the obverse, and a chariot in action on the reverse. In no. 2 Apollo's hair, bound with a headband, becomes the most prominent feature; three large curls are shown in front. It was evidently beyond the craftsman's skill to make a fair representation of the chariot. Instead he has given us an acrobatic horse, whilst the charioteer is transformed into a flying angel! In no. 3 Apollo's face is no longer in the field, but the three curls and the headband remain, the hair now being completely stylized. In nos. 4 and 5 the curls are reduced to two. The hair is then rapidly replaced by a number of round pellets until these too finally disappear, and we are left with a functionless headband! We must now return to the performing horse. Another transformation, and in no. 3 we surely have the most comical horse ever depicted on a coin! One wonders if the accident to his front legs was caused by collision with a runaway chariot wheel! Thereafter he disintegrates rapidly, no. 4 showing his dismembered body, four legs and what looks like an eye. In no. 5 he is still recognisable, whilst his dwindling remains are neatly arranged for us in no. 6. After this the most ardent horse lover would not know him! The dismembered horse of Celtic art is also represented in the White Horse cut in the green turf of the Berkshire Downs above Uffington.

Debased silver coins of types 4 and 5 are fairly common in Dorset and Hampshire. They have been struck by using two

dies in the usual way. A new feature appears in the Holdenhurst and Hengistbury hoards, which include large numbers of bronze coins that have been cast in a mould; they are all of types 6 to 10, or very similar, and show the final stages in the deterioration of the design. These cast coins of the Hengistbury class have a slight prominence on the edge showing where the metal was poured into the mould. In contrast to many of the struck coins, they nearly all appear to be in mint condition.

A few Roman coins associated with both hoards indicate that they were deposited about the middle of the 2nd century A.D. Hengistbury appears to have remained a purely native port during the occupation, the Romans for some reason preferring to concentrate on improving the harbour of Hamworthy, which they made into a road terminus. The local survival of a native currency through a whole century of Roman rule is certainly remarkable; possibly the prestige of Hengistbury was still great enough to enable its inhabitants to assert a considerable degree of independence.

KEY TO COLLECTIONS.

A.T.M.H.	A.T. Morley Hewitt, Esq., Fordingbridge.
B.M.	British Museum.
B.N.S.S.	Bournemouth Natural Science Society.
C.C.M.	Red House Museum, Christchurch.
D.C.M.	Dorset County Museum.
G.M.L.	G. M. Lock, Esq., Wimborne.
P.M.	Poole Museum.
P.R.F.	Pitt Rivers Museum, Farnham.
R.C.M.	Russell Cotes Museum, Bournemouth.
S.M.	Salisbury Museum.
W.E.W.	W. E. Wright, Esq., Salisbury.

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The Grass Family and Man

By ERNEST CHAMBERS, F.L.S.

A Lecture delivered on November 29th, 1952 (abridged).

Gramineae comprises nearly 400 genera with over 4,000 distinct species. These are represented wherever flowering plants can survive, and have adapted themselves to conditions varying from icy cold to tropical heat : desert sand to swamp and water : sea-level to snow-line and acid to alkaline soils. Their structure is simple and typical—fibrous roots, round and hollow stem (excepting solid Sugar-cane and Maize) with prominent solid nodes, parallel-veined leaves and wind-pollinated flowers on spikes or panicles. In the ripe seed the embryo is placed at one side of the endosperm, feeding upon it through the scutellum during germination. In this endosperm lies the value of the seed as human food. Grasses may be degenerate from something akin to the Lily, as certain internal structure seems to confirm, or are themselves the primitive form of Monocotyledons.

Grasses were probably the first plants to be studied by mankind. The earliest nomads would notice which types were preferred by their horses and other animals : in what areas and conditions these flourished best : and the fact that manuring by animals and disturbance of the soil improved growth—and thus came cultivation. More settled man would notice the same effects on ground where he had thrown his waste or buried his enemies.

Few Grass genera are directly eaten by man, but these are so outstanding that we speak of food as “our daily bread”; so, first, to the bread-grains or cereals. At seed-time and harvest the Romans held festivals in honour of Ceres, the giver of grain, when offerings of Wheat and Barley, called “*cerealia munera*”, (gifts of Ceres) were made. Thus, the bread-grains came to be known as “*cerealia*”. We now include as cereals not only Wheat and Barley but also Rye, Oats, Rice and Maize—five from the Eastern and one from the Western Hemisphere. Cereals were cultivated earlier in Egypt and Mesopotamia. Grains have been disintombed after 4,000 years, whilst prehistoric remains of lake dwellers show that Wheat, Barley, Oats and Rye were in use amongst the ruder early peoples of Europe. The antiquity of Maize will be specially mentioned. We can only conjecture when the definite cultivation of Grasses began. It is assumed that it had been a regular custom to gather ripe wild grain, just as American Indians harvest the wild Rice to this day. Thus, the type of grain flourishing in a given locality would be first cultivated in that region, whence, if worth while, it would spread to other parts of the world. Cereals anchored Man to his own part of the land. Tilling, sowing, harvesting, threshing and guarding

his stored grain precluded wandering; then, from the communal effort required for irrigation or draining, civilization naturally sprang.

In staple food value, cereals have storing advantage over root-crops and a better balance of protein, carbohydrates and fat than nuts and dates.

White bread eaters prefer the seed of *Triticum spp.* as a breadstuff to all other grain. Wheat cultivation is prehistoric, probably originating in Mesopotamia from the Grass, *Aegilops ovata*. The earliest Wheat may have been Pharaoh's Corn, *T. compositum*, an awned, compound-eared variety synonymous with "mirable" (Miracle or Mummy-wheat), still grown on a small scale in S.E. Europe and N. Africa. These archaic, strong-bearded varieties are still favoured for growing in suitable localities where birds are troublesome. Some Wheats can be treated as winter annuals: those of shorter life as summer annuals: others may even be grown in the short Arctic summer, as in Alaska where it has stood up to the seven weeks' continuous photosynthesis between seed and harvest. If the water content of seed of Winter Wheat is raised and the grain then left at a temperature too low for further germination, a physiological change takes place. Later, it can be dried sufficiently to allow easy sowing. Seed of Winter Wheat treated in this way and sown in Spring, develops very rapidly. This is the practice of vernalisation. *T. sativum* has first place in quantity and the 1952 Canadian crop of 656 million bushels proves that it thrives in new homes. Hard Wheat, *T. durum*, is valued for the high content within its endosperm of the protein gluten or gliadin, which gives to wheaten dough its tenacity and elasticity. Bread made from other grains needs addition of wheaten flour to make it light and palatable. In S. Europe *T. durum* is grown for production of macaroni, vermicelli and spaghetti, which owe their consistency to gliadin. The flint wheat is crushed into a coarse meal or semolina, then mixed into a thick dough and forced through holes in a metal disc. Hard Wheat is much grown in China for spaghetti, noodles, etc. Wheaten straw provides thatching material, straw-board and Tuscan straw hats. Other cultivated species of *Triticum* are *T. turgidum*—Clock or Humpy-grained W., *T. spelta*—Dinkel W., *T. monococcum*—St. Peter's Corn, and *T. dicoccum*—Emmer Wheat.

Barley, *Hordeum vulgare* or *H. distichon*, also originated in W. Asia in prehistoric times, but its prototype has not been identified. The ancient kinds are long-awned but in new varieties, cultivated in Russia (via the U.S.A.), the awns are nearly lost. Primitive peoples of Europe and the Middle East used Barley as a staple food. It is now chiefly cultivated for the production of malt on the way to beer—another ancient practice. Malting consists in sprouting the grains and allowing conversion of starch

into sugar to proceed until as much malt-sugar as possible is produced: then killing the germination of the seed by heat so that it cannot utilise any of the sugar which, dissolved out and fermented with yeast, forms beer. Barley, in spite of its more southerly origin, will thrive even further north than Oats.

Oat, *Avena sativa*, originated in temperate Asia, but may not have been cultivated as early as Wheat and Barley. The smaller species *A. orientalis* (Tartary Oat), had its origin further east. Both are hardy and tolerant and so are grown as food in Iceland, Scandinavia, Scotland and similar countries, but the grain is not easily separated from the husk and it is therefore mostly used in animal rations, where its fat content supplements the hay.

The origin of Rye (*Secale cereale*) is not easy to establish. West Central Asia is suggested, but it was very early known in Cent. and E. Europe and is certainly at home in Hungary. It yields a harvest on poorer soil than any other grain, so that peasantry in poorer and hilly districts rely on it for a dark bread. There is grave danger in the exclusive use of rye-bread, as the ear is susceptible to the attack of *Claviceps purpurea*, the poisonous Ergot of Rye, which causes abortion, skin diseases and possibly gangrene.

The date of the evolution and first cultivation of *Zea mais*, Maize, or (in America) Corn, is bound up with the antiquity of Cent. American civilisation and is itself used as an argument. Biologists identify Maize with Teosinte (*Euchlaena mexicana*), with which it still freely hybridises. It was probably first cultivated on the Guatemalan hills where Teosinte grew abundantly, yet appears conventionally on Incan or pre-Incan remains, as well as Mayan. To satisfy all facts, it must have been fully established by A.D.500—and how much earlier we do not know. A monolith from Piedras Negras, sculptured probably 1,000 years ago, depicts the harvest-god Yum-Kax sowing quite recognisable seeds of Maize. As early depicted, the cobs are of large dimensions, whereas present-day heads at the same high altitudes are miserably small. Many explanations have been advanced, but it is probably the result of in-breeding. Eight successive generations of Maize, each self-pollinated, shew equal degeneration. In countries with three months of sunshine and warm moisture, Maize is the most successful cereal. Even when the grain fails to ripen, the green stems and leaves make excellent silage. The male flowers, on tall panicles, cause hay-fever to many: the female are in spiral rows on a fleshy axis with long silky styles. The ripe grains contain two kinds of endosperm—starchy and horny—the latter very rich in protein. Nothing is wasted. Whole or cracked grains are fed to stock: finer meal is corn-flour or polenta. Corn flakes are whole grains with the embryo removed and steamed, flavoured and rolled. Another valuable product, corn

syrup or glucose, is obtained by partial hydrolysis of the starch with acid and subsequent neutralisation, evaporation and filtering. Corn on the cob is the adjunct to soup in America, and a drink called pulque or chicha is a potent alcoholic beverage brewed from nearly ripe grains. The stem is not a success in the manufacture of paper.

The other major cereal is Rice (*Oryza sativa*) whose culture in S. E. Asia is prehistoric. Chinese records of it date back 4,000 years. According to ancient custom, Rice grains were planted annually with appropriate ceremonial in token of its paramount value to the nation. Its origin is in no doubt, as it occurs wild in swamps of Tropical Asia and Africa. Rice was developed from the Asiatic species and its culture appears to be very disagreeable farming. Mud is first prepared on well-watered terraces or irrigated fields: seeds are sown closely in beds and tufts of seedlings taken out and paddled into position. The mud dries as the plants develop and the abundant fecundity repays the trouble. Women separate the grain from the chaff by beating it with a pestle in a wooden trough. Machinery is little used. White rice is prepared by being scoured and polished and finally rubbed with glucose and talc. Removal of the germ and its Vitamin B1 is one reason for beri-beri. Rice probably serves as food for more humans than any other grain and the antiquity of its cultivation and the labour expended upon it are shewn in the marvellous terraces for its growth. Saki is brewed and distilled from rice grains. Similar are the Hong-Kong samshu, S.E. Asian arrack and the rice brandy chouchou. Rice straw provides thatch, hats and rough clothing. (Rice paper is made from *Fatsia* of the *Araliaceae* and has no connection with Rice).

From Wild Rice (*Zizania aquatica*) of N. America and the Manchurian Water Rice (*Z. latifolia*) man still takes a scanty harvest, as originally from every food grain. The former, sometimes also called Water Oats, is gathered by Indians, who pull the ripe panicles into the boat and beat out the grain with heavy sticks. Primitive cultivation or conservation is seen in the habit of cruising around before harvest and tying clusters of fruiting stalks to give mutual protection. The ears are dried and husked in conical wooden troughs. Early explorers and settlers relied on the Wild Rice, but it is now only planted as food for wild duck etc. in sporting areas. Manchurian Water Rice is kept protected and flooded, to produce strong young shoots used as a vegetable under the name of Kiao Cabbage.

The drought-resisting Sorghums and Millets in dry regions take the place occupied by Rice in the swamps. Their prototype is believed to be *Andropogon sorghum*, Broom Corn, or, as it is still called in its wild state, *A. halepensis*, Johnson-grass. Other types are Durra, Rice Corn, Guinea-corn etc. *Sorghum caudatum*

is an important food in Sudan and E. Africa. As well as inferior grain, stock food and ensilage, species of *Sorghum* are used for fuel, mats, fences, wind-breaks, roof-thatches and fermented drink, so that the genus is of versatile economic value. The Millets *Pennisetum glaucum*, *Panicum miliaceum* and *Chaetochloe italicum* are used as poultry grains. They can mature in six weeks in the tropics. The thick, succulent sugar-containing stems of *Sorghum saccharatum* yield an inferior molasses and are used as fattening for stock.

The Grass Family might claim pre-eminence on account of Sugar Cane alone. The craving for sweetness is the call for calories as fuel for the human machine or for glucose vitally essential in the blood. Nature's answer is sugar, the crystallised product of the sap of *Saccharum officinarum*. Ratoons, sections of the stem planted in deep friable earth, soon sprout and develop rapidly until the tendency to flower indicates that the stem is full of sap and ready for cutting. The green tops are cut away and the bare canes are crushed, the sap boiled, filtered and reduced to emerge as raw sugar, to be refined to the white crystal. The result may be four tons to the acre from twenty tons of cane. The current annual world production of cane sugar alone reaches 25 million tons. There are various stage-products and by-products of prime importance to mankind. Molasses is used as such in great quantities and is the basic source of rum, power alcohol and industrial alcohol. Saccharum, invert sugar, a mixture of glucose and levulose, prepared from crude cane-sugar by the action of acids, is used in manufacture of preserves and confectionery, the preparation of alcohol and as a substitute for malt in brewing. Dry crushed cane is used as fuel in sugar mills, but modern uses also include insulation against heat, cold and sound, and the manufacture of tough boards. A recent sugar product is a concentrated proteid, obtained by growing the Yeast *Torula* in aerated molasses.

Saccharum sagittatum, the Bitter Cane, resembles Sugar Cane but, having very small sugar content, its great value is in the roofing and plaited walls of tropical huts. Next to Bamboo, it is the tallest Grass.

First place to species of other utility than food goes to about twenty species of Bamboo in the genera *Bambusa*, *Dendrocalamus* and *Arundinaria*. The tall *D. strictus* may reach 80 feet in height in one growing season of a few weeks. The poles are used in building and as ladders. The stems are hollow but with solid nodes so that sections make small kegs or, split with the internal node removed, make good small runnels for irrigation. Split lengths make laths for building, beds and furniture, or the pathway of light bridges, also constructed of climbing Bamboo. Smaller species provide canes for all purposes, hats and fibrous

material of many kinds. In some areas, Bamboos are the indispensable all-purpose vegetation. The simple flutes and pan-pipes made from the hollow stems may have been the original reed-music. Succulent young Bamboo shoots are a Chinese table delicacy. Lastly, the rôle of Bamboos in tropical beauty must not be forgotten.

Many Grass fibres are of economic importance. Examples are *Stipa tenacissima*, the Esparto Grass and *Lygeum spartum*, in the manufacture of tough paper. Numerous others are used in paper and card making. Broom Grass and similar types provided the first nests and shelters for higher apes and lower men, and Reed-grass still thatches cottages. Probably the first navigation of the Tigris or Ganges was performed on bamboo rafts bound with other grasses and supported by inflated skins.

Though shifting sands are not a major problem in Britain, we rely on Marram and Lyme Grass on some coasts for the conservation of land. Similar types are of vital importance in arid regions.

Only the Couch Grass and Dog's-tooth are medicinal Grasses. Near specifics are *Vetiveria zizanioides* (Cus-cus), and *Cymbopogon*, the Ginger-grass of India, both used in perfumery; and *Cymbopogon nardus* is well known in Citronella Oil. All these are very fragrant and are used to ward off insect attacks.

Lastly,—Grasses used as fodder, either in green or ensilaged form or as dry hay: actually, the first use of the Grass Family by mankind was as food for his milk-producing cattle and mares and, indirectly, of the animals which he slew. Rye-grasses, Fescues, Poas, Sweet Vernal-grass, Timothy and others, thrive so well in a wild state that only comparatively recently have biologists, studied their selection and improvement. Experiments in introduction were made two centuries ago e.g. *Dactylis caespitosa*, Tussack Grass, from the Falklands to the Hebrides and many Fescues from New Zealand to Britain. *Phleum pratense* travelled from N. Europe to America, then was re-introduced to Britain for agricultural purposes about 1780 by Timothy Hansen—hence its name, Timothy. Agricultural science now makes an ecological study of grasses and pastures, upland and lowland, moorland and paddock, exposed or sheltered, heavy or sandy, moist or dry, acid or neutral. All are scrutinised, literally by the square inch, to observe the behaviour of selected varieties. The state and time of development of every part—root system, stem, leaf, inflorescence and seed—are recorded and selection trials made wherever mutations occur. From all this emerges a system whereby the exact mixture of Grasses can be prescribed to suit all conditions and requirements. As they are stabilised, the varieties receive a number e.g. Perennial Ryegrass S.23 is a

good pasture grass, S.24 early hay and S.21 late hay. Leafy Timothy S.50 is pasture, S.48 pasture hay and S.51 hay. Sportsmen help by observation of the growth and resistance of the various species in playing fields.

Every county is mapped with its natural grass growth e.g. West Somerset is *Agrostis* pasture; then strips of *Agrostis* with excess of Ryegrass or Fescue: and in the Centre is third-grade Ryegrass. On this basis is built up pasture improvement. Ensilage, or the production of grass-cake, is a fairly modern practice utilising grass growth which otherwise would be wasted. The green grass is cut and packed in the silo with or without addition of molasses. Some fermentation takes place and a successful result resembles a tobacco cake and is highly nutritious. The last word is with the hay crop—the symbol of an English summer and the most valuable industry in the land. The stages in harvesting hay are commonly known, but few realise the importance of each, in order that the chemical changes in the presence of enzymes at the correct percentages of moisture, should take the appointed course. The fragrance of new-mown hay, chemically the result of the development of coumarin in the Sweet Vernal Grass, is one of the charms of the English scene and, aesthetically, one of the happiest connections of the Grass Family with Mankind.

Obituary

Miss A. Parnell Jones

Anna Parnell Jones had been looking forward to coming to Bournemouth for the Jubilee Celebration Week of the Society, and to meeting old friends. Unhappily she died at her home in Pagham, near Bognor Regis, on the day of the Jubilee Garden Party, May 2nd, 1953.

Miss Jones was born in September, 1874, in North London. She came to reside in Parkstone in 1929, and joined the Society in 1930. She soon became an active and generous member, in spite of the handicap of a crippling lameness. Those of us who knew her best could not but admire her acceptance, without complaint, of her severe disability. Among her benefactions were the defraying of the cost of converting the first floor lavatory of the Society's building into a Ladies' Toilet; and the organising of a concert in the Lecture Hall for the benefit of the funds of the Society. She engaged a B.B.C. soprano, Hebe Simpson, and one of Mr. Bury's daughters, Miss G. Bury, kindly played her Recorder, accompanied by Miss Jones, who was no mean pianist (Guildhall School of Music).

Miss Jones became a generous Chairman of the Tea Committee (supplementing crockery, etc.) from November 1945 until the middle of February 1949, when she left Parkstone and eventually settled in Pagham. We were very sorry to lose her from our midst, but she retained her membership and her interest in the Society. She always visited "No. 39" when she was in the vicinity of Bournemouth.

S. A. COLTAR.

Miss Winifred Maria Dunton

Winifred M. Dunton, whose death at the age of 77 occurred on March 10th, 1953, was born at Worksop, Nottinghamshire, on February 12th, 1876. She lived at Southwold, Suffolk, and was Deputy Curator at the local museum where she was working only two days before she was taken ill. She had been known to the writer for over forty years and had written a long and interesting letter early in February with no indication of the illness which ended her life so suddenly.

Miss Dunton became a life member of the South-Eastern Union of Scientific Societies in 1937 and served on the Council. She became Hon. Secretary of the Gilbert White Fellowship at its inception in February, 1918, and held that office until the

Fellowship was dissolved in 1950. On behalf of the Fellowship she handed over a donation of £100 to our Society, a condition of the gift being that it should be used for the objects for which the Fellowship was founded, namely, to continue the work of Gilbert White in the study of Natural History and Antiquities. The gift included a book-case, now in our reference library, and a handsome collection of books including several editions of the "Natural History of Selborne," all of which were exhibited at our Gilbert White Exhibition (1951) at which Miss Dunton was present. Life members of the Fellowship were offered country membership of our Society without subscription, and it is pleasant to record the deep appreciation of this offer by Miss Dunton and her fellow members. Miss Dunton's attractive personality had won her many friends and she will be greatly missed.

W.B.W.

Seven Year Covenant Scheme

The Council would like to see more members undertaking the seven year covenant for subscriptions. If the member is paying income tax at the higher rate, (9/6 in the £) the Society can recover so much of the tax as almost to double the value of the subscription. All the member does is to pay the ordinary subscription and sign a certificate once a year. This is how the scheme works out:—

The tax on £2 17s. 2d. at 9/6 in the £ is £1 7s. 2d., leaving a balance of 30/-. If this is paid in subscription, the Society can reclaim the £1 7s. 2d. paid in income tax. Thus—A subscription of:

30/- under covenant provides £2 17s. 2d. to the Society.

50/- ,, ,, ,, £4 15s. 4d. ,, ,,

15/- ,, ,, ,, £1 8s. 7d. ,, ,,

and so on, pro rata.

It is felt that, among our large membership, there are probably many others who would assist in this way, if they understood the procedure and the need.

We would emphasise that the covenants are terminated by death, that the whole business of recovering the tax is done by the Society, and that the member, if liable to taxation at the maximum rate on part of his income, undertakes no other liability than the ordinary subscription.

The Secretary will be pleased to provide forms and any further information.



PRESENTED

11 FEB 1954

